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HAND BOOK
OF
THERAPY



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The Gift of
Dr. Francis W. Palfrey.

Handbook of Therapy

FOURTH EDITION

EDITED AND REVISED

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1915

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PREFACE

The matter which appeared in the Therapeutic Department of *The Journal of the American Medical Association* has been widely commended. The first three editions of the Handbook of Therapy were based wholly on these articles. Advances in therapeutics have necessitated new articles at various times, and requests have been received for a revised edition of the book. In the preparation of this edition, only the most recent articles in the Therapeutic Department have been included. Where no recent article on any given subject was available, notably the gastro-intestinal diseases, the skin diseases, kidney disturbances and some of the acute infections, new articles have been prepared. In this work the collaboration of Dr. Jerome H. Salisbury, who died before the completion of the book, and of Dr. N. S. Davis III, has been helpful.

Conditions governing therapeutic requirements are stated as clearly and concisely as possible. With rare exceptions, the formulas which the book contains are combinations which can be easily compounded by any pharmacist.

The form of the book has been made such that it can be carried in a satchel or pocket. To enhance its value as a handbook, various tables and compilations of valuable data have been added.

MORRIS FISHBEIN, M.D.

Chicago, 1915.

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PREScription WRITING

INTRODUCTION

Correct prescription writing is such a close corollary to good therapeutics that it seems pertinent to introduce it in this book. Although some of the material which appears in this and subsequent chapters may seem elementary, it is hoped that the physician who cares to read it will pardon such detail in order that the subject may be presented entire.

Therapeutics in its broadest sense is the ultimate aim of the science and practice of medicine. It includes not only drug therapy, to which its definition is so often erroneously limited, but also everything that has to do with the treatment of the disease, the management of the patient, his convalescence, or his permanent return to health, and of the prevention of disease attacking the well.

The administration of drugs is only a small part of the management of disease, and the management of disease is the highest pinnacle of the medical curriculum. It presupposes all the physiologic, chemical, anatomic, pathologic, bacteriologic and pharmacologic knowledge that can be obtained. This knowledge is then brought to bear on the management of the disease, which means necessary hygienic changes, perhaps a change of climate, an arrangement of the food and drink, physical treatment if indicated, such mental treatment as is advisable, such medicinal treatment as is needed, and necessary operative procedures, and, altogether this is therapeutics. The subject of therapeutics is, then, the broadest and the hardest one for the medical student to grasp, and it is safe to say that the young graduate in medicine, even after a hospital course, is less prepared in the bedside and office management of disease than in any other branch of his art.

A proper understanding of and proper teaching of the ability of the mind to overcome many nervous disorders, to prevent the misinterpretation of, and the exaggeration of, slight physical disturbances should

be encouraged. Psychotherapeutic instruction should be given in every medical school, and hospitals should have psychotherapeutic wards.

PRESCRIBING PROPRIETARIES

While simplicity in prescription-writing is advisable, it cannot be gainsaid that the art of combining drugs or of rendering a drug less disagreeable should be taught in the medical schools. Even with this laudable object in view, however, it is not justifiable for a physician to belittle his profession and forget rationality in his treatment of a patient, to say nothing of the enormous graft which he hands the proprietary firms from the pockets of his patients, by ordering proprietary mixtures. The physician who orders such preparations does not realize the positive harm he often does his patients, in some instances almost amounting to criminal negligence. No one deems it reputable, or scientific, or just to patients to prescribe preparations the ingredients of which he does not know. This is little less than malpractice. With the aid of an honest druggist, by means of our Pharmacopeia and National Formulary, we hardly need a single proprietary mixture in the medicinal treatment of disease.

PHARMACOPEIA AND NATIONAL FORMULARY

Few physicians know the range and compass of these books. No sane person would advocate using all of the heterogeneous mass of preparations included in them, but every physician can, with the aid of his druggist, select the few formulas that he will use that will be as elegant and pleasant methods of giving drugs as proprietary preparations, and, moreover, will represent guaranteed doses of the various ingredients of the formulas selected. While the use of some of the ready made preparations is advised, it should be understood that it is much better to combine one's own prescription to fit the individual case.

None of this should prevent a physician from trying a new drug if he thinks it is an honest one, because we should be ever ready to make use of a valuable discovery, but never to further fraud. Such a new drug should be ordered straight or used only in our own

combinations, and never in a ready-made mixture offered by the firm interested. New and Nonofficial Remedies is a book containing a list of such approved remedies, with a description of their preparation, their action and dosage.

OFFICIAL PREPARATIONS

The principal preparations of the United States Pharmacopeia may be classified as follows:

1. Solids mostly for internal use:
 - A. Extracts (*extracta*).
 - B. Pills (*pilulæ*).
 - C. Powders (*pulveres*).
2. Liquids mostly for internal use:
 - A. Waters (*aquæ*).
 - B. Elixirs (*elixira*).
 - C. Emulsions (*emulsa*).
 - D. Fluidextracts (*fluidextracta*).
 - E. Infusions (*infusa*).
 - F. Liquors (*liquores*).
 - G. Mixtures (*misturæ*).
 - H. Spirits (*spiritus*).
 - I. Syrups (*syrupi*).
 - J. Tinctures (*tincturæ*).
3. Semisolids for external use:
 - A. Cerates (*cerata*).
 - B. Ointments (*unguenta*).
4. Liquids for external use:
 - A. Liniments (*linimenta*).
 - B. Some waters (*aquæ*).
 - C. Some liquors (*liquores*).
 - D. Some tinctures (*tincturæ*).

1. Solids Mostly for Internal Use

A. *Extracts* are concentrated preparations of a drug, and are mostly moist and sticky. A few extracts are dry. They should be prescribed in pill or capsule.

The most important are:

| | |
|-------------------------------|---------------------------|
| Extractum belladonnæ foliorum | Dose, 0.01 gm. or gr. 1/6 |
| Extractum digitalis | Dose, 0.01 gm. or gr. 1/6 |
| Extractum ergotæ | Dose, 0.25 gm. or gr. iv |
| Extractum nucis vomicæ | Dose, 0.01 gm. or gr. 1/6 |
| Extractum physostigmatis | Dose, 0.01 gm. or gr. 1/6 |
| Extractum rhamni purshianæ | Dose, 0.25 gm. or gr. iv |
| Extractum opii | Dose, 0.03 gm. or gr. 1/2 |

B. Official *pills* are ready-made preparations, and consequently it should be remembered that they may have deteriorated or become more or less insoluble. Still some of the laxative pills, especially, are of value.

The following is a ready reference to the ingredients of the most used pills:

Blaud's pills (*pilulæ ferri carbonatis*) contain 0.065 gm. (1 gr.) of iron.

Pills of aloes (*pilulæ aloes*) contain 0.13 gm. (2 gr.) of aloes.

Pills of aloes and iron (*pilulæ aloes et ferri*) contain 0.065 gm. (1 gr.) each of aloes and iron.

Compound cathartic pills (*pilulæ catharticae compositæ*) contain extract of colocynth comp. 0.08 gm. ($1\frac{1}{4}$ gr.); calomel 0.06 gm. (1 gr.); resin of jalap 0.02 gm. ($\frac{1}{3}$ gr.); gamboge 0.015 gm. ($\frac{1}{4}$ gr.).

Vegetable cathartic pills (*pilulæ catharticae vegetabiles*) contain extract of colocynth comp. 0.06 gm. (1 gr.); extract of hyoscyamus 0.03 gm. ($\frac{1}{2}$ gr.); resin of jalap 0.02 gm. ($\frac{1}{3}$ gr.); extract of leptandra 0.015 gm. ($\frac{1}{4}$ gr.); resin of podophyllum 0.015 gm. ($\frac{1}{4}$ gr.).

Compound laxative pills (*pilulæ laxativæ compositæ*) contain aloin 0.013 gm. ($\frac{1}{5}$ gr.); strychnin 0.0005 gm. ($\frac{1}{120}$ gr.); extract of belladonna leaves 0.008 gm. ($\frac{1}{8}$ gr.); ipecac 0.004 gm. ($\frac{1}{15}$ gr.).

Compound podophyllum pills (*pilulæ podophylli, belladonnæ et capsici*) contain resin of podophyllum 0.016 gm. ($\frac{1}{4}$ gr.); extract of belladonna leaves 0.008 gm. ($\frac{1}{8}$ gr.); capsicum 0.032 gm. ($\frac{1}{2}$ gr.).

Compound rhubarb pills (*pilulæ rhei compositæ*) contain rhubarb 0.13 gm. (2 gr.); aloes 0.10 gm. ($1\frac{1}{2}$ gr.); myrrh 0.06 gm. (1 gr.).

C. Official *powders* are dry preparations of two or more drugs. It is better to order a powder by its official title, but below are the common names and the ingredients of the most used of these preparations:

Dover's powder (*pulvis ipecacuanhæ et opii*) contains 10 per cent. each of ipecac and opium.

Tully's powder (*pulvis morphinæ compositus*) contains 1.5 per cent. of morphin and 32 per cent. of camphor.

Compound aromatic powder (*pulvis aromaticus*) is a mixture of aromatics.

Compound jalap powder (*pulvis jalapæ compositus*) contains 35 per cent. of jalap and 65 per cent. of potassium bitartrate.

Compound licorice powder (*pulvis glycyrrhizæ compositus*) contains 18 per cent. of senna; 23 per cent. of glycyrrhiza; 8 per cent. of sulphur.

Gregory's powder, compound rhubarb powder (*pulvis rhei compositus*) contains 25 per cent. of rhubarb; 65 per cent. of magnesium oxid; 10 per cent. of ginger.

Seidlitz powder (*pulvis effervescens compositus*) consists of two powders; one of Rochelle salt and bicarbonate of soda in blue paper, and the other of tartaric acid in white paper.

2. Liquids Mostly for Internal Use

A. *Waters* are solutions of *volatile* substances in *water*; mostly *weak* preparations. (Exception, ammonia waters.)

H. *Spirits* are solutions of *volatile* substances in *alcohol*; mostly *strong* preparations. (Exception, sweet spirits of niter.)

F. *Liquors* are solutions of *non-volatile* substances in *water*; mostly *weak* preparations. (Exceptions, the arsenic solutions and those for external use.)

J. *Tinctures* are solutions of *non-volatile* substances in *alcohol*; mostly *strong* preparations. (Exceptions are the aromatic and stomachic [bitter] drug tinctures.)

H. Some of the common names of spirits are:

Whisky (*spiritus frumenti*).

Brandy (*spiritus vini gallici*).

Sweet spirits of niter (*spiritus ætheris nitrosi*).

F. Some of the common names of liquors are:

Fowler's solution (*liquor potassii arsenitis*).

Spirit of Mindererus (*liquor ammonii acetatis*).

Lugol's solution (*liquor iodi compositus*).

Goulard's solution (*liquor plumbi subacetatis*).

Labarraque's solution (*liquor sodæ chlorinatæ*).

B. *Elixirs* are sweetened liquid preparations containing alcohol. They are weak preparations, and the National Formulary contains a large number.

C. *Emulsions* are liquid preparations containing a suspended oil or resin.

D. *Fluidextracts* are liquids representing exact strengths of the drugs, i. e., 1 cubic centimeter (15 minims) contains the medicinal properties of 1 gram (15 grains) of the drug.

E. *Infusions* are weak watery preparations. One only is of value, viz., *infusum digitalis*.

G. *Mixtures* are liquids containing more than one drug, often an insoluble one. The most used are:

Brown mixture (*mistura glycyrrhizæ compositus*).

Chalk mixture (*mistura cretæ*).

The National Formulary contains a long list of mixtures.

I. *Syrups* are very sweet watery solutions of one or more drugs. These weak preparations are prescribed too frequently, as they readily cause disturbance of the stomach, and do not often modify a bad-tasting drug, but may even protract the taste. Sweet cough syrups are an abomination.

3. *Semisolids for External Use*

A. and B. The principal difference between *cerates* and *ointments* is their melting-points. The ointments contain more lard or petroleum fat and less wax than the cerates, hence they have a lower melting point than the latter. Cerates do not melt when applied to the skin.

4. *Liquids for External Use*

Some *waters*, some *liquors*, some *tinctures* and the *liniments*, as the name implies, are used externally only. Most of the liniments are stimulating to the skin, but two being sedative, viz., the belladonna liniment and the carron oil (*linimentum calcis*).

SYNONYMS

The following are frequently used synonyms:

AQUA FORTIS, Acidum nitricum, U. S. P.
 AQUA REGIA, Acidum nitrohydrochloricum, U. S. P.
 BASHAM'S MIXTURE, Liquor ferri et ammonii acetatis, U. S. P.
 BASILICON OINTMENT, Ceratum resinæ, U. S. P.
 BLACK DRAUGHT, Infusum sennæ compositum, U. S. P.
 BLACK DROP, Acetum opii, U. S. P.
 BLACK WASH, Lotio nigra, N. F.
 BLAUD'S PILL, Pilula ferri carbonatis, U. S. P.
 BLEACHING POWDER, Calx chlorinata, U. S. P.
 BLUE MASS, Massa hydrargyri, U. S. P.
 BLUE OINTMENT, Unguentum hydrargyri dilutum, U. S. P.
 BLUE VITRIOL, Cupri sulphas, U. S. P.
 BROWN MIXTURE, Mistura glycyrrhizæ composita, U. S. P.
 CARRON OIL, Linimentum calcis, U. S. P.
 DOBELL'S SOLUTION, Liquor sodii boratis compositus, N. F.
 DONOVAN'S SOLUTION, Liquor arseni et hydrargyri iodidi, U. S. P.
 DOVER'S POWDER, Pulvis ipecacuanhæ et opii, U. S. P.

EPSOM SALTS, *Magnesiæ sulphas*, U. S. P.
 FOWLER'S SOLUTION, *Liquor potassi arsenitis*, U. S. P.
 GLAUBER SALT, *Sodii sulphas*, U. S. P.
 GOULARD'S EXTRACT, *Liquor plumbi subacetatis*, U. S. P.
 GRAY POWDER, *Hydrargyrum cum creta*, U. S. P.
 GREGORY'S POWDER, *Pulvis rhei compositus*, U. S. P.
 GRIFFITH'S MIXTURE, *Mistura ferri composita*, U. S. P.
 HIVE SYRUP, *Syrupus scillæ compositus*, U. S. P.
 HOFFMANN'S ANODYNE, *Spiritus ætheris compositus*, U. S. P.
 HUXHAM'S TINCTURE, *Tinctura cinchonæ composita*, U. S. P.
 LABARRAQUE'S SOLUTION, *Liquor sodæ chlorinatæ*, U. S. P.
 LUGOL'S SOLUTION, *Liquor iodi compositus*, U. S. P.
 LUNAR CAUSTIC, *Argenti nitras fusus*, U. S. P.
 MAGENDIE'S SOLUTION, *Liquor morphinæ hypodermicus*, N. F.
 MONSELL'S SOLUTION, *Liquor ferri subsulphatis*, U. S. P.
 SUGAR OF LEAD, *Plumbi acetatis*, U. S. P.
 VALLET'S MASS, *Massa ferri carbonatis*, U. S. P.
 WARBURG'S PILL, *Pilula antiperiodica*, N. F.
 WARBURG'S TINCTURE, *Tinctura antiperiodica*, N. F.
 YELLOW WASH, *Lotio flava*, N. F.

THERMOMETRIC EQUIVALENTS

To convert degrees Centigrade to degrees Fahrenheit, multiply by 9, divide by 5, and add 32 to the quotient. To convert degrees Fahrenheit to degrees Centigrade, subtract 32, multiply by 5 and divide by 9. A few commonly used equivalents are as follows:

| C. | F. | |
|------|---------|--|
| 0 | = +32 | Freezing point of water. |
| 4 | = 40 | Greatest density of water. |
| 15.5 | = 60 | Temperature at which most hygrometers are graduated. |
| 25 | = 77 | Used in estimations as room temperature. |
| 37 | = 98.6 | Normal body temperature. |
| 40 | = 104 | |
| 56 | = 132.8 | Point of inactivation. |
| 60 | = 140 | Sterilizing and Pasteurizing temperature. |
| 100 | = 212 | Boiling point. |

WEIGHTS AND MEASURES

It is not necessary to describe here the old system or to give its tables of weights and measures, as they occur in every book on prescription-writing, but some tables of approximate equivalents to the metric system will be offered. Exact equivalent tables are a delusion and only tend to befog and discredit the metric system. When it is remembered how the doses of drugs vary, it will be recognized how absurd it is to figure an equivalent to its finer determinations.

It is not necessary to declare that the decimal (metric) system of prescription-writing is the better, because the fact is recognized by all and the only hindrance to its use is the supposed difficulty of mastering

it. Science of all countries has adopted it—even our own Pharmacopeia. If the novice in the use of the metric system in prescription-writing will remember that it is a decimal system like our monetary system, that everything on the left of the decimal point or line represents grams or cubic centimeters [dollars], that everything on the right of the decimal line represents centigrams, milligrams, or fractions of a cubic centimeter [cents and mills], he will soon understand the system. A rule for the approximate conversion of apothecary dosage into metric is to write for a two ounce mixture as many grams as there would be grains in a single dram dose.

In this country it is customary in writing prescriptions in the metric system to write for solids in terms of grams and fractions of grams, and for liquids in terms of cubic centimeters or fractions of cubic centimeters. The same decimal line which should be ruled on the prescription blank answers for both solid and liquid metric measures, and precludes all possibility of careless decimal mistakes, as:

gm.

c.c.

|

It is best to use in prescribing, only two denominations, grams and milligrams. Liquids, of course, are expressed as cubic centimeters.

As above declared, it is useless to translate the old system into exact equivalents of the new system. One must compute the doses in the new system; one must forget the size of stock bottles and order amounts of liquids in multiples of five, as 15 c.c., 25 c.c., 50 c.c., 100 c.c., or 200 c.c.; one must remember that 5 c.c. is a teaspoonful dose, i. e., an ordinary teaspoon holds 5 c.c. and not 4 c.c. or a liquid dram; in other words, *every* prescriber in the old system has *always* given a larger dose than he intended when he computed the dose by fluidrams and then administered a teaspoonful; one should remember that the drop, so much used in prescribing strong liquid preparations, is as correct in the new system as in the old. All of these suggestions

must be followed out to use the metric system successfully.

TABLE OF THE APPROXIMATE EQUIVALENTS ON THE TWO SYSTEMS

| | gm. | c.c. |
|---|--|--|
| 1 grain (gr.i) = approximately... | 0\|065 | = 65 milligrams = 1 grain. |
| 1 minim (m.i) = approximately... | 0\|065 | = 65/1000 of a cubic centime- ter = 1 minim. |
| 15 grains (gr.xv) = approximately. 1\| |  | = 1 gram = 15 grains. |
| 15 minims (m.xv) = approximately. 1\| |  | = 1 cubic centi- meter = 15 minims. |
| 1 dram (ʒi) = approximately..... 4\| |  | = 4 grams = 1 dram. |
| 1 fluidram (fl.ʒi) = approximately. 4\| |  | = 4 cubic centi- meters = 1 fluidram. |
| 1 ounce (ʒi) = approximately.....30\| |  | = 30 grams = 1 ounce. |
| 1 fluidounce (fl.ʒi) = approximately.30\| |  | = 30 cubic centi- meters = 1 fluidounce. |
| 1 quart | = approximately 1000 c.c., or 1 liter. | |
| 1 pint | = approximately 500 c.c. | |
| 1 teaspoonful | = approximately 5 c.c. | |

It is always a good plan to use a stub prescription blank, and on the stub the individual doses may be written. This is another check on mistakes and also preserves for reference the exact dose given on the exact date, as:

| Stub (one dose) | | Prescription for 20 doses | | |
|--------------------|-----|--------------------------------------|-------------|---------------|
| R | | R | gm. c.c. | Old system |
| Strych. sulph. | 001 | Strychninæ sulphatis.. | 02 | gr. ⅓ |
| Ferri reducti. | 05 | Ferri reducti..... | 1 | gr. xv |
| Quin. sulph.. | 10 | Quininæ sulphatis.... | 2 | gr. xxx |
| M. et F. cap. | | M. et F. capsulas 20. | | |
| Sig.: t.i.d., p.c. | | Sig.: A capsule 3 times a day, after | | |
| Name. | | meals. | | |
| Age. | | | | |
| Date. | | | | |

Or,

Stub (one dose)

Prescription for 20 doses

| R̄ | | R̄ | gm. c.c. (approximately) | Old system |
|-----------------------|--|--------------------------------------|--------------------------------|---------------|
| Codein. sulph.. .01 | | Codeinæ sulphatis.. | 20 | gr. iv |
| Ammon. chlor. .25 | | Ammonii chloridi.. | 5 | ʒiiss |
| Syr. acid. cit.. 1.25 | | Syrupi acidi citrici. | 25 | fl.ʒi |
| Aquam .....ad 5. | | Aquam .....ad 100 | | ad fl.ʒiv |
| M. | | M. | | |
| Sig.: 5 c.c.q. 2 h. | | Sig.: A teaspoonful, in water, every | | |
| in H ₂ O. | | two hours. | | |
| | | Shake. | | |

It is well to use the Arabic numerals instead of the Roman in the new system, as:

R̄

Pilulas rhei compositas No. 20.

Sig.: One pill after supper.

Stub (single dose)

Prescription

| R̄ | | R̄ | gm. c.c. | Old system |
|-------------------------------|--|---|-------------|---------------|
| Tr. digitalis. | | Tincturæ digitalis... | 25 | or fl.ʒi |
| Sig.: 10 drops in | | Sig.: Ten drops, in water, twice a day, | | |
| H ₂ O b.i.d., p.c. | | after meals. | | |

Stub

Prescription

| R̄ | | R̄ | gm. c.c. | Old system |
|---------------------|--|-----------------------------------|-------------|---------------|
| Ung. hg. ammon. | | Unguenti hydrargyri | | or |
| Petrolati ....āā 10 | | ammoniatī 10 | | āā ʒiiss |
| M. | | Petrolati 10 | | |
| Sig.: Externally. | | M. | | |
| | | Sig.: Use externally as directed. | | |

INCOMPATIBILITY

This is prevented only by great care and simplicity. Too many drugs should not be prescribed. Too many solutions should not be combined. Too many drugs and too much medicine should not be given to one patient on any one or two days. Many drugs are cumulative and many of their physiologic activities are antagonistic. Drugs may be incompatible *therapeutically, chemically and pharmaceutically*.

Therapeutic incompatibility occurs when drugs are combined which have antagonistic physiologic actions.

Chemical incompatibility occurs when from the combination of two or more drugs a new and undesired chemical compound results.

Pharmaceutic incompatibility occurs when drugs are combined which form, either immediately or later, cloudy, precipitated or decomposed solutions.

An educated physician should be ashamed to perpetrate a therapeutic incompatibility either in a prescription or in a patient. It is not therapeutic incompatibility, however, to modify a too decided action of a drug with one that corrects an undesired effect. This is a part of therapeutic science.

Pharmaceutical incompatibility is so closely related to chemical incompatibility that many times both are governed by the same rule. Such incompatibility is difficult to avoid, and therefore it is advisable to adopt simplicity in prescription-writing; this is really a therapeutic gain.

Below is given an alphabetical list of drugs comprising those that should generally be given alone, especially in solutions. The chemical reasons are appended:

Acids, unless very dilute and in small amount, should be prescribed alone. They combine with bases to form salts, and are incompatible with oxids, alkalies, alkaline salts, hydrates and carbonates. They usually precipitate albumin.

Alkalies and alkaline carbonates should rarely be prescribed in solution with other drugs. They form salts with acids and precipitate many metallic and alkaloidal salts.

Alkaloidal salts should rarely be combined with other drugs in solutions. They are precipitated by alkalies, alkaline carbonates, earthy carbonates, preparations containing tannic acid, and by iodids in solution.

Antimony and potassium tartrate (tartar emetic) should be prescribed in solutions alone. It is incompatible with acids, alkalies, tannic acid, and preparations containing tannic acid.

Arsenic (arseni trioxidum, arsenious acid) should generally be prescribed in solutions alone.

It is precipitated by salts of iron, magnesia, and solutions of lime.

Bromids in solution should not be combined with alkaloids. They precipitate the salts of morphin, quinin, and strychnin from neutral solutions.

Ferric and ferrous salts should generally be prescribed alone. They are incompatible with tannic acid and all drugs containing it; with alkaline carbonates, ammonia, and acacia.

Iodids should generally be prescribed alone.

They are incompatible with salts of alkaloids and metals and with mineral acids.

Mercuric chlorid (corrosive sublimate) should generally be prescribed alone. It is incompatible with many drugs.

Mercurous chlorid (calomel), though insoluble, had best not be prescribed in mixtures. In solutions containing chlorids it may be converted into the mercuric salt.

Resins, including oleoresins, and fluidextracts and tinctures containing resins, should not be prescribed in watery solutions, though they may be ordered in emulsion by suspending them with the mucilage of acacia or tragacanth.

They are all precipitated by water.

Silver nitrate solutions and solutions of all silver salts must be ordered alone, and kept in dark bottles. If silver salts are prescribed for internal administration they must be alone or combined with some earth, and given in capsules.

Strophanthus in the form of the tincture should not be prescribed in solutions containing water.

Spirits (spiritus), except sweet spirits of niter, whisky and brandy, should mostly not be prescribed with watery preparations. They become cloudy on the addition of water.

Tannic acid, and all drugs containing tannic acid, should not be prescribed with most drugs. They are incompatible with alkaloids, salts of iron, lead, silver and antimony.

THE HARRISON ANTINARCOTIC LAW

This law affects the physician both as a prescriber and as a dispenser of drugs. It requires the prescribing physician to register with the collector of internal revenue of the district. In writing a prescription for narcotic or habit forming drugs, coming under this act, the physician must write thereon the name and address of the patient, and must have on the prescription his office address and his registry number. He must sign his name in full. He need not keep either copies or records of prescriptions; this is done by the druggist. These prescriptions cannot be refilled.

If the physician desires any of the specified drugs for his own use, he must then make out an order for them on a blank form bearing his registry number. These blanks are furnished by the Internal Revenue

Department in packages of ten for ten cents. The physician cannot order drugs for his own use on a prescription blank.

When he dispenses, the physician assumes the work of the druggist and is subject to the same rules. He must then keep a record in a suitable book of all habit-forming drugs dispensed, the number of persons dispensed to and the date. Such treatments as he may personally administer, or cause to be administered when away from his office need not be recorded.

LATIN

Enough has been said in the introduction concerning the desirability of writing prescriptions for Pharmacopeial or National Formulary preparations. The corollary to this advice is to write a prescription correctly, as to dosage, compatibility and Latin. It is presumed that the groundwork of prescription-writing has been acquired from some elementary book, and it is proposed here merely to furnish some hints which may be an aid in writing prescriptions simply, correctly and elegantly, and in preventing some of the more serious mistakes in Latin.

The beginning of a prescription is usually the letter *R*, meaning *recipe* ("take," imperative mood of the verb *recipio*); the cross over the tail of the *R*, it has been said, is an abbreviated zodiacal sign or invocation to Jupiter. Others have claimed it is simply an abbreviation. This verb *recipe* takes the quantities of the drugs ordered in the accusative, while the names of the drugs are in the genitive case, as:

| imperative verb | genitive case | accusative case |
|-----------------|--------------------|-----------------------|
| take | of soda | 1 gram (or 15 grains) |
| <i>R</i> | sodii bicarbonatis | 1 gm. or gr.xv |

In the following lists of words and rules for the correct use of Latin in prescriptions, Osborne's "Introduction to Materia Medica and Pharmacology" has been freely drawn on.

Rules for Cases in Prescriptions

1. The verbs *fac* and *recipe* (*R*) take objects in the accusative case.

2. When the object of the verb is the quantity ordered, the name of the medicine goes in the genitive case.

3. In the following instance, the name of the substance goes in the accusative case, as the object of the verb. The quantity is given in a dependent phrase (ad 30 c.c.), and therefore cannot be the object.

| | | | |
|------|-------|-------|-------------------------|
| R | Aquam | ad | 30 c.c. or fl.ʒi |
| Take | water | up to | 30 c.c. or 1 fluidounce |

But the name of the substance goes in the genitive in the following instance:

| | | | | |
|------|----------|------------|-------|-------------------------|
| R | Aquæ | q.s. | ad | 30 c.c. or fl.ʒi |
| Take | of water | as much as | up to | 30 c.c. or 1 fluidounce |
| | | necessary | | |

Here the object of *recipe* is *q. s.*, on which *aquæ* depends.

The Declension of Pharmacopeial Latin Nouns

With few exceptions nouns ending in —a have the genitive ending in —æ; nouns ending in —um and —us have the genitive ending in —i; all others in —is.

Exceptions

The various exceptions to the above rule may be found by consulting the above-mentioned manual of prescription-writing. As indication of the changes in irregular forms the following may be mentioned:

NOMINATIVE

theobroma
spiritus
rhus
pix
folia (pl.)

GENITIVE

theobromatis
spiritus
rhois
picis
foliorum

Abbreviations Used in Prescription-Writing

It is common to use certain abbreviations in prescription writing. This is perhaps due to the fact that abbreviations dispense with the need of remembering the various endings. The Pharmacopeias have recognized official abbreviations of pharmacopeial titles. The following are abbreviations of Latin phrases commonly used in directions:

| Abbreviation | Latin | Translation |
|--------------|--------------------|--------------------------|
| āā | ana (Greek) | of each |
| ad | ad | up to |
| ad lib. | ad libitum | to the desired amount |
| cap. | capsula,—ae. | a capsule |
| co. or comp. | compositus-a-um | compound |
| div. | divide | divide |
| ext. | extractum,—i | an extract |
| ft. | fiat or fiant | let it (or them) be made |
| flext. | fluidextractum,—i, | a fluid extract |
| gtt. | gutta,—ae | drop or drops |
| liq. | liquor,—is. | a solution |
| m. | misce | mix |
| mist. | mistura,—ae | a mixture |
| pil. | pilula,—ae | a pill |
| pulv. | pulvis,—eris | a powder |
| q. s. | quantum sufficiat | a sufficient quantity |
| ss. | semis, semissis | a half |
| sig. | signa | mark |
| sol. | solutio,—onis | a solution |
| spts. | spiritus | a spirit |
| t. i. d. | ter in die | three times a day |
| tr. | tinctura,—ae | a tincture |

Latin Verbs

The Latin verbs used are best placed in the imperative mood. The most frequently used are:

| | |
|-----------------|------------------|
| adde (add) | misce (mix) |
| divide (divide) | recipe (take) |
| fac (make) | signa (write) |
| filtra (filter) | solve (dissolve) |

DOSAGE

The dose of a drug should be based on the age, weight and individuality of the patient, and the necessity for a strong action of the drug.

The frequency of the dose is determined by the results obtained, by the length of time it takes the drug to be eliminated or cease its action, and the possibility of its causing a cumulative effect.

While age is an all-important element in the determination of the dose, the weight, unless in the obese, is the most important element, except in the case of narcotics given to children. Children have more central nervous system as compared to their weight than adults, and therefore are more profoundly affected by drugs which act on the brain, than are adults. In other words, a given dose of a narcotic, especially of the opium series, for an adult must be more reduced in size for a young child than any table of reduction computed by age or weight would determine.

The best simple rule of dosage by age is the following:

At 20 years, the adult dose.

At 10 years, $\frac{1}{2}$ the age, $\frac{1}{2}$ the dose.

At 5 years, $\frac{1}{4}$ the age, $\frac{1}{4}$ the dose.

At $2\frac{1}{2}$ years, $\frac{1}{8}$ the age, $\frac{1}{8}$ the dose.

At 1 year, $\frac{1}{12}$ the dose.

Children whose ages are between the ones here specified may readily be prescribed doses a little more or less than the dose determined by the age nearest theirs in the table.

The relation of size and weight to the dose is all-important. A large child of 2 years should certainly receive a larger dose than a weakly, small child of the same age. Also a small adult of 20 should receive less than a large muscular individual of the same age. The blood of an adult represents about one-thirteenth of his total weight. This is not true of children or of the obese. Hence the dose of an obese individual may be even less than if his weight were normal.

The following are the average weights for normal adult males. It should be remembered that females up to the age of 45 or 50 generally weigh less than males; also that a range of from 20 to 25 pounds above or below the average weight, the patient's general condition being good, is not necessarily considered a weight too high or too low for acceptance as an insurance risk. Above or below this range of 20 to 25 pounds from the average is generally considered overweight or under-weight, and the acceptance of such an individual for insurance becomes questionable.

TABLE OF AVERAGE WEIGHT TO HEIGHT AT DIFFERENT AGES

| Ft. In. | Year | | | | | | | |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 15-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-60 |
| 5-0 | 120 | 125 | 128 | 131 | 133 | 134 | 134 | 134 |
| 5-1 | 122 | 126 | 129 | 131 | 134 | 136 | 136 | 136 |
| 5-2 | 124 | 128 | 131 | 133 | 136 | 138 | 138 | 138 |
| 5-3 | 127 | 131 | 134 | 136 | 139 | 141 | 141 | 141 |
| 5-4 | 131 | 135 | 138 | 140 | 143 | 144 | 145 | 145 |
| 5-5 | 134 | 138 | 141 | 143 | 146 | 147 | 149 | 149 |
| 5-6 | 138 | 142 | 145 | 147 | 150 | 151 | 153 | 153 |
| 5-7 | 142 | 147 | 150 | 152 | 155 | 156 | 158 | 158 |
| 5-8 | 146 | 151 | 154 | 157 | 160 | 161 | 163 | 163 |
| 5-9 | 150 | 155 | 159 | 162 | 165 | 166 | 167 | 168 |
| 5-10 | 154 | 159 | 164 | 167 | 170 | 171 | 172 | 173 |
| 5-11 | 159 | 164 | 169 | 173 | 175 | 177 | 177 | 178 |
| 6-0 | 165 | 170 | 175 | 179 | 180 | 183 | 182 | 183 |
| 6-1 | 170 | 177 | 181 | 185 | 186 | 189 | 188 | 189 |
| 6-2 | 176 | 184 | 188 | 192 | 194 | 196 | 194 | 194 |
| 6-3 | 181 | 190 | 195 | 200 | 203 | 204 | 201 | 198 |

In determining the dose it is most important to consider whether or not the patient has any exceptional susceptibility to the given drug. When an idiosyncrasy or abnormal susceptibility to a certain drug or to drugs of a certain class is known, the drugs causing it should, if possible, not be administered. That peculiar phenomenon, now known as anaphylaxis, is one which also should be taken into account in this connection.

Sometimes such undesired action of a drug occurs with the first dose only, notably in the case of quinin, and a tolerance to the drug is, after this first dose, temporarily acquired.

Another idiosyncrasy of a patient may represent a tolerance to a drug such that large doses must be given to produce any effect. This tolerance may be natural or acquired by previous use of the drug.

Still other very important predispositions of a patient are caused by the disease affecting him, by the condition of his digestive and absorptive system, and by the condition of his eliminative organs. The disease present may create a tolerance or an increased susceptibility to a drug. Slow absorptive powers may render the action of the drug almost impossible or allow accumulation of dangerous amounts of the drug (under which conditions the drug should be given hypodermatically, if it is needed). Slow or retarded elimination due to defective eliminative organs will allow cumulative action of many drugs.

The drugs which are most frequently found unexpectedly to cause undesirable or even serious symptoms in susceptible individuals are quinin, salicylates, atropin-containing drugs, iodine-containing drugs, and opium and its alkaloids.

The diseased conditions that most seriously modify (lessen) the dose of a drug are nephritis and cirrhosis of the liver.

A condition of shock precludes immediate absorption from the stomach, hence such a condition must be combated, if by drugs, hypodermatically.

Frequency of the Dose

It should be carefully learned how long, ordinarily, it takes a given dose of a drug to act, and how long

before it is mostly eliminated. This determines the frequency of the dose. Also some drugs are eliminated so slowly that they tend to accumulate in the system or are deposited in the various organs so that medication may occur days and even weeks after the cessation of the administration of the drug.

A few of the rapidly acting drugs are:

| | |
|---------|--------------|
| Alcohol | Iodids |
| Ammonia | Salicylates |
| Camphor | Strophanthin |
| Caffein | Strychnin |
| Chloral | |

These act in a few minutes to an hour or so, hence the intervals at which they may be given range from every hour to every three hours, or three times a day, according to the drug.

A few of the slowly acting drugs are:

| | |
|-----------|------------------------|
| Arsenic | Quinin |
| Atropin | Synthetic antipyretics |
| Bromids | Synthetic hypnotics |
| Digitalis | Thyroid |
| Mercury | |

These act in from several hours to twenty, hence should be given once or twice a day, according to the drug.

A few of the drugs that tend to accumulate in the system are:

| | |
|---------|-----------|
| Arsenic | Digitalis |
| Atropin | Mercury |
| Bromids | Strychnin |

Many drugs cause eruption on the skin either due to irritation of the stomach and duodenum or to their being more or less excreted by the skin and irritating the glands during such excretion, or they may cause flushing of the skin.

Examples of drugs causing the first kind of irritation are: copaiba, chloral, opium, quinin, salicylates, synthetic compounds, volatile oils; drugs of the second type are arsenic, bromids and iodids; those of the third type are antitoxin, atropin and thyroid.

It should always be remembered that some drugs are excreted into the milk; hence if the mother is

nursing her baby, some drugs should be avoided, and some given only infrequently; or on the other hand, the baby may be medicated through the mother.

Generally speaking, most narcotics (opium, bromids etc.); most so-called alteratives (arsenic, mercury, iodids, thyroid): most cathartics and quinin are excreted by the milk.

METHODS OF ADMINISTERING DRUGS

Drugs and serums are more than occasionally administered intravenously, but as the technic requires skill, most perfect asepsis, and should require the enforcement of at least twenty-four hours of absolute rest, this method is not likely to be frequently resorted to. Moreover it seems to be a fact that, when a drug or serum is injected intramuscularly, the rate of absorption and activity of a substance is almost as rapid as when it is given intravenously, and the danger of accidents is much less.

The hypodermatic or subcutaneous method is of very great value in all emergencies, but should not be used too frequently. Of course the most frequent need for such medication is caused by pain, which must be combated by morphin or its equivalent, and the danger of acquiring a habit is greater when the drug is used hypodermatically than when it is given in any other way.

Of course the most frequent method of giving a drug is by the mouth, either in liquid, powder, pill, capsule or tablet. A drug will surely act more quickly if given in liquid solution, and more quickly on an empty stomach. If it is disagreeable, however, it should be given in capsule if the character and dose of the drug will allow it. Also if a drug is irritant, it should not be given on an empty stomach. A disagreeable liquid drug should not be combined with a syrup, which does nothing but prolong the taste and upset the stomach, but should be given in plain water to be followed by any kind of taste the patient prefers, such as orange, lemon, or by a peppermint or winter-green candy for example. Or the liquid may be given in a sour mixture as lemonade or syrup of citric acid and water, or it may be given in a mineral or car-

bonated water. A powder may be given in milk or in an effervescing water.

Capsules are the nicest means of giving drugs disagreeable in taste and small in dose. The contents of a capsule should be dry for rapid solution, the principal advantage of a capsule over a pill. If rapid action is desired, or if it is feared that the capsule, slowly dissolving on a small part of the mucous membrane of the stomach will irritate the membrane, the capsule may be uncapped at the moment of swallowing, and the result is the same in the stomach as though the drug had been taken in powder. Alcohol in any form in the stomach will retard the solution of a capsule. Pills are not so much used as before the capsule became so popular. The solution and absorption of a pill must be slow, unless it contains some particles of a substance that swells with water, as starch. Sugar, chocolate, or gelatin-coated pills and tablets make the solution still slower, though in the case of drugs to act on the intestine this may be of advantage.

The much-used tablet, compressed or triturate, doubtless renders much medication valueless, and perhaps, fortunately, harmless. The speed of solution of most tablets on the market is problematical, hence if the action of a tablet is immediately desired it should be predissolved, or at least crushed by the teeth before swallowing. All antipyretic coal-tar tablets should be crushed before swallowing and then a good drink of water taken with them. It should not be forgotten that anything that may bite or irritate the membrane of the mouth will do the same to the mucous membrane of the stomach. Hence bromid tablets should never be taken undissolved. Potassium chlorate tablets dissolved in the mouth or swallowed are dangerous. Potassium chlorate solutions for the mouth and throat are valuable, but there is no justification for ever taking potassium chlorate into the stomach or into the system.

A very soluble tablet dissolved and absorbed from the mouth will give almost as rapid action as when given hypodermatically.

The rectum absorbs drugs given by means of suppositories or injections nearly and sometimes quite

as rapidly as does the stomach. But sedatives and some laxatives only are ever administered by suppositories for systemic effect.

A few drugs are given endermically, but except in the case of mercury the method is uncertain.

Mucous membranes may be treated by douching, injection, insufflation, and those of the air passages by inhalation. Some drugs are absorbed by all of these methods, and if poisonous drugs are used, the possibility of too great an absorption must always be kept in remembrance.

CLASSIFICATION OF DRUGS

While dictionaries and encyclopedias must be arranged alphabetically for ready reference, alphabetical arrangement of drugs for the practicing physician is very unsatisfactory. Also, for a practicing physician, classification based on chemical constituency, pharmacologic peculiarities, or toxic action is absolutely of no value. A drug may have a chemical, physiologic or toxic activity that is of no value from a therapeutic standpoint. The classification always of value and always necessary for the practicing physician is one based on therapeutic uses.

The following classification, arranged according to therapeutic indications, is copied from Osborne's small text-book on "Materia Medica and Pharmacology." While it could not be claimed that this enumeration of drugs comprises all that are of value, it does comprise the best, and any drug that aspires to a place in such a classification must show positive physiologic activity and therapeutic success to prove that it should be classed among these, the best drugs. Under each heading the drugs are named alphabetically and not in the order of their value.

FIRST DIVISION—FOR LOCAL ACTION

CLASS 1.—Drugs used to destroy microorganisms.

- A. *To disinfect* (drugs too strong to be used on the body).
For buildings: Formaldehyd, sulphurous acid, steam.
For clothing: Formaldehyd, heat. For dejecta: Chlorinated lime.

- B. *To inhibit the growth of bacteria on the body or in one of its cavities* (antiseptics): Alcohol, cresol, formaldehyd solution, hydrogen dioxid solution, mercuric chlorid, phenol, salicylic acid.
- C. *To destroy skin-parasites* (parasitocides): Betanaphthol, chrysarobin, ichthyol, iodine, mercury, pyrogallol, resorcin, sulphur, the above antiseptics.

CLASS 2.—Drugs used on the skin.

- A. *To protect* (dressings): Acetanilid, bismuth preparations, boric acid, iodine synthetic powders, lycopodium, talcum, zinc oxid, zinc stearate.
- B. *To soothe* (emollients): Almond oil, boroglycerid, cacao butter, glycerin, olive oil, petroleum oils, wool fat.
- C. *To cause hyperemia* (mild counter-irritation): Tincture of iodine, liniments, mustard.
- D. *To blister*: Cantharides.
- E. *To corrode* (escharotics): Chromic acid, glacial acetic acid, nitric acid, potassium hydroxid, salicylic acid, silver nitrate, trichloroacetic acid.

CLASS 3.—Drugs used to act on mucous membranes.

- A. *To soothe* (demulcents): Albumin water, barley water, flaxseed infusion, milk, warm physiologic saline solution, slippery elm infusion.
- B. *To diminish secretion* (astringents): Alum, bismuth salts, weak silver solutions, suprarenal preparations, tannic acid, weak zinc solutions.
- C. *To stimulate*: Copper salts, silver salts, zinc salts.

CLASS 4.—Drugs used for local action in the stomach.

- A. *To increase the appetite* (stomachics): Cinchona, gentian, nux vomica, salicin, vegetable bitters.
- B. *To aid digestion*: Diastase, hydrochloric acid, pancreatin, pepsin.
- C. *To reduce acidity* (antacids): Ammonia, chalk, lime water, magnesia, sodium bicarbonate.
- D. *To cause vomiting* (emetics): Apomorphin (acting on the vomiting center), copper sulphate, ipecac, mustard, zinc sulphate.

CLASS 5.—Drugs used for local action in the intestinal canal.

- A. *To increase peristalsis* (carminatives): Anise, capsicum, cardamom, cinnamon, peppermint.

B. To promote evacuation of the bowels:

| <i>Laxatives.</i> | <i>Purges.</i> | <i>Salines.</i> | <i>Irritants.</i> |
|-------------------------|-----------------------------------|--|-------------------|
| Aloes. | Calomel. | Magnesium cit- rate. | Colocyath. |
| Magnesia. | Castor oil. | Magnesium sul- phate. | Croton oil. |
| Podophyllum. | Compound ca- thartic pill. | Potassium and sodium tar- trate. | Elaterium. |
| Rhamnus pur- shiana. | A. large dose of any laxative. | Seidlitz powder. Sodium phos- phate. | Jalap. |
| Rhubarb. | | Sodium sul- phate. | |
| Senna. | | | |
| Sulphur. | | | |

C. To correct fermentation: Betanaphthol, thymol, salicylic acid, salol (phenyl salicylas).

D. To remove parasites (anthelmintics): Aspidium, betanaphthol, pepo, quassia, spigelia, thymol.

SECOND DIVISION—FOR SYSTEMIC ACTION

CLASS 1.—Drugs used to act on the skin after absorption.

A. To stimulate: Arsenic, thyroid.

B. To decrease perspiration: Atropin.

C. To increase perspiration (diaphoretics): Alcohol, antipyrin, pilocarpin.

CLASS 2.—Drugs used to act on the genito-urinary system.

A. To increase the amount of urine: Buchu, caffeine, digitalis, scoparius, squill, water.

B. To modify the character of the urine: Hexamethylenamin (urotropin), methylene blue, potassium acetate, potassium bicarbonate, potassium citrate, salicylic acid, salol.

C. To stimulate the mucous membranes: Cantharides, copaiba, cubebs, oil of santal.

D. To increase menstruation (emmenagogues): Iron, manganese dioxid, thyroid.

E. To contract the uterus (oxytocics): Ergot, hydrastis, quinin, viburnum.

CLASS 3.—Drugs used to act on the respiratory tract.

A. To increase the secretion of mucous membranes (expectorants): Ammonium chlorid (small doses), ipecacuanha, iodids.

B. To decrease the secretion of the mucous membranes: Ammonium chlorid (large doses), atropin, codein, heroin, morphin, terpin hydrate.

C. To relax spasm: Atropin, bromids, chloral, gelsemium, morphin, nitroglycerin, stramonium, tobacco.

CLASS 4.—Drugs used to act on the circulation.

- A. *To stimulate the heart*: Ammonia, camphor.
- B. *To depress the heart*: Aconite, veratrum.
- C. *To strengthen the heart*: Caffein, digitalis, strophanthin, strychnin.
- D. *To contract the blood-vessels*: Atropin, ergot, supra-renal.
- E. *To dilate the blood-vessels*: Alcohol, nitrites.

CLASS 5.—Drugs used to act on the nervous system.

- A. *To stimulate* (cerebral stimulants, antispasmodics, excitomoters): Asafetida, caffein, camphor, cannabis indica, phosphorus, strychnin, thyroid, valerian.
- B. *To depress* (analgesics; depresso-motors): Acetanilid, aconite, acetphenetidinum (phenacetin), antipyrin, belladonna, bromids, chloral, lobelia, opium.
- C. *To produce sleep (hypnotics)*: Bromids, chloral, hyoscin, paraldehyd, sulphonethylemethanum (trional), sodium diethyl barbiturate (veronal-sodium).
- D. *To produce anesthesia*: General: Chloroform, ether, nitrous oxid. Local: cocain, ethyl chlorid, ice, menthol, phenol.

CLASS 6.—Drugs used to lower the temperature of the body.

Antipyretics: Acetanilid, acetphenetidinum (phenacetin), antipyrin, cold.

CLASS 7.—Drugs used for actions which are specific.

Antitoxins in acute infection; cinchona in malaria; colchicum in acute gout; iodids (in small doses long continued) in some disturbances of metabolism, notably sclerosis; iron in anemia; mercury in syphilis; salicylic acid in acute arthritis; thyroid in myxedema.

CLASS 8.—Unclassified organic extracts.

Mammary, ovarian, pancreas, parotid, pituitary, testicular, thymus.

TREATMENT OF POISONING

As the symptoms and treatment of poisoning are many times so similar, it seems best to divide poisons into classes, and then to describe the treatment of each class, rather than to multiply individual descriptions.

The following classification is of types of drugs. The individual drugs with references to the class to

which they belong, and therefore to the treatment advisable, will be found in a table on another page.

CLASS 1.—Irritants of the Gastro-Intestinal Canal.

Acids.

Alkalies.

Irritant metallic salts.

CLASS 2.—Irritants of the Central Nervous System.

Atropin-containing drugs.

Caffein-containing drugs.

Cocain.

Scopolamin (hyoscin).

Strychnin.

Volatile oils.

CLASS 3.—Depressants of the Nervous and Circulatory Systems.

All cardiac drugs in large doses.

Coal-tar products.

Cyanids.

Hypnotics.

Narcotic drugs.

Nicotin.

Most phenol-containing drugs.

CLASS I.—IRRITANTS OF THE GASTRO-INTESTINAL CANAL

Most irritants in weak dilutions are astringent, while most astringents in strong solutions are irritant. The action of astringents and irritants on mucous membranes is, therefore, largely one of degree. Some astringents act chemically to form albuminates with the protein substance found on moist mucous membranes, thus coating and preventing the further irritation of the membrane. At the same time the blood-vessels of the membrane are contracted, the membrane is dried, and the secretion diminished. This is typical metallic astringent action. If this albuminate is insoluble or very slowly soluble in the media surrounding it the action just described is the only action due to the astringent, viz., there may be more or less pronounced irritation at first, but the after-effect is sedative. If, however, this albuminate tends to dissolve at its junction with the mucous membrane, the action

of astringency is then continued and may become so irritating as to cause severe inflammation or with some metallic salts or acids cause ulceration and corrosion. Such drugs or preparations are called "gastro-intestinal irritants," and in poisonous doses will all produce the same immediate symptoms. Later individual symptoms or conditions develop due to the character of the substance absorbed, to its chemical nature and to the amount of local corrosion that it can cause.

Different metals have different powers of astringency and irritant action; also different salts of the same metal vary in the irritation which they will produce. The acid formed after the dissociation of the metallic ion decides the amount of irritation that the salt will cause. Also the greater the ease with which the metallic ion is dissociated from its acid ion the greater the corrosion; therefore, the soluble nitrates and chlorids are much more corrosive than the acetates, citrates and tartrates. The sulphates are between these groups in their irritant effect.

The most astringent metals in the order of their astringency are lead, iron, aluminum, copper, zinc and silver. The most astringent salt is lead acetate, while the most irritant salts are mercuric nitrate, mercuric chlorid and zinc chlorid. The sulphates and acetates of copper and zinc and the nitrates of silver and lead, if applied in weak solutions, are astringent, but are irritant if in large quantities or in strong solutions. Insoluble preparations of mercury may irritate and corrode, but insoluble salts of other metals are generally only astringent. Double salts of the metals are less likely to irritate, because they ordinarily do not precipitate albumin. A styptic strongly coagulates albumin, and hence causes a clot which stops hemorrhage.

SYMPTOMS

The symptoms common to all gastro-intestinal irritants are irritation or corrosion of the mouth, throat and esophagus, depending on the concentration of the poison swallowed. Other symptoms are: more or less gastric pain; nausea; vomiting, first of the contents of the stomach, then of mucus, then often of blood;

later diarrhea, first of the contents of the bowels, then mucus, and, perhaps, blood are passed. There are more or less symptoms of shock due to the reflex action on the heart from irritation of the gastric branches of the pneumogastric nerve. The symptoms of collapse are a rapid, weak heart, dyspnea, cold surface of the body, clammy, cold perspiration, tendency to syncope, and a gradual failure of the pulse.

The symptoms of poisoning by gastro-intestinal irritants are:

Immediate Symptoms:

- Pain.
- Nausea.
- Vomiting.
- Colic.
- Diarrhea.
- Collapse.

Frequent After-Symptoms:

- Inflammation and ulceration of the mouth, throat and esophagus.
- Gastritis.
- Duodenitis (jaundice).
- Enteritis.
- Albuminuria.
- Nephritis.
- Ulceration, perforation, peritonitis.

Possible Remote Symptoms:

- Fatty degeneration of the liver, kidneys and heart.
- Strictures from the healing of the corrosions and ulcerations.

TREATMENT OF CORROSIVE POISONING

Immediate Treatment: Warm water drinks containing the antidote, if there is one (an emetic or a stomach-tube is rarely needed, and, if necessary, should be used with great caution and gentleness); albuminous and mucilaginous drinks, as milk, egg albumin, flax-seed infusions, slippery elm infusions, etc.; hypodermatic injections of morphin sufficient to stop pain and continued vomiting. For corrosive acids the most convenient antidote is usually a solution of soap.

Treatment of Collapse: Rest, quiet; dry heat, especially to the region of the heart; atropin sulphate,

1/100 of a grain hypodermatically; strychnin sulphate or nitrate, 1/30 of a grain hypodermatically; repeated in three hours, if needed (large doses of strychnin are not advisable, as it cannot stimulate the heart or raise the blood-pressure as so long believed); camphor, a syringe-ful hypodermatically of a saturated solution in sterile olive oil (or a ready-prepared ampoule), every half hour for several doses; caffein as strong coffee, by rectal injection if there is no diarrhea.

After-Treatment:—Give a saline purge, if deemed necessary. For acute gastritis give morphin sufficient to stop the pain, mucilaginous drinks, rectal alimentation. Give cardiac stimulants, if needed. Later give bismuth subcarbonte in large doses (2 grams or 30 grains) twice a day; later, a milk diet. Treat duodenitis and nephritis, if they occur. Order absolute rest in bed for one or two weeks, if the irritation or corrosion was severe, lest perforation from ulceration be precipitated. Treat ulcer of the stomach and strictures, if they occur.

CLASS II.—IRRITANTS OF THE CENTRAL NERVOUS SYSTEM

The principal symptoms of poisoning by drugs of this class are those of irritation of the central nervous system. There is restlessness and nervous excitement; there may be, later, delirium and convulsions, and, perhaps, still later, coma. The pulse is full, bounding, and generally rapid; there may even be delirium cordis or tachycardia. Respirations are increased in rapidity, the face is flushed and the skin of the body feels hot and dry, and there often is increased temperature. There may be vomiting; there often is diarrhea; there is vesical irritability, and often strangury, depending on the drug. Some drugs of the atropin series may cause vesical paresis. There are muscular twitchings: there may be cramps; and, as above stated, convulsions may occur. The pupils are of course dilated if the poisoning is by any member of the atropin series or by cocain, and they often become dilated during cerebral excitement from other members of this group.

The symptoms of poisoning by irritants of the central nervous system are:

Immediate Symptoms:

Gastro-intestinal burning and pain, perhaps nausea and vomiting, if the poison contains an aromatic or volatile oil.

Cerebral excitement.

Rapid heart.

Rapid respiration.

Erythemas and flushing of the face and surface of the body.

Frequent After-Symptoms:

Purging.

Frequent urination.

Muscular twitchings.

Delirium.

Convulsions.

Coma.

Failure of the circulation.

Possible Remote Symptoms:

Abortion in pregnant women.

Albuminuria and nephritis if the poison is a renal irritant as are many of the volatile oils.

Prolonged sleeplessness and nervous irritability.

**TREATMENT OF POISONING BY IRRITANTS OF THE
CENTRAL NERVOUS SYSTEM**

Administer warm water with the antidote, if there is such.

Give an emetic. The emetics in the order of their strength are: mustard (a tablespoonful in a glass of warm water); ipecac (2 gm. [30 grains] of powdered ipecac, or a tablespoonful of the syrup); zinc sulphate (2 gm. [30 grains] dissolved in water); copper sulphate (0.50 gram [7½ grains] dissolved in water); apomorphin (1/10 of a grain given hypodermatically). Any of these emetics may be repeated in fifteen minutes if there is no satisfactory result. It should be remembered that apomorphin is depressant to the circulation.

Wash out the stomach by means of a stomach-tube if there is no satisfactory emesis. If the vomiting is satisfactory, continue to administer warm water until the stomach washes clean.

Administer one or more nerve sedatives. The best are bromids and chloral, and the dose depends on the character of the poison. They are best administered

by the rectum, at least provided nausea and vomiting is continued after the stomach has been cleared of the poison. If there is much circulatory depression, the best sedative to administer is morphin, hypodermatically, perhaps combined with scopolamin (hyoscin). An adjunct to the action of the morphin as a central nervous sedative and as a strengthener of the circulation is ergot, given intramuscularly. If there are convulsions, inhalations of chloroform are required.

Apply dry heat to the body, if the surface is cool or there is a tendency to collapse.

If heart failure occurs later in the poisoning, from shock or from the depression caused by nausea, such circulatory stimulants should be given as camphor (a saturated solution in olive oil hypodermatically); strophanthin (given hypodermatically or intravenously in a dose of 1/500 of a grain); epinephrin in aseptic ampoule or 1 c.c., 15 minims, of a 1 part to 10,000 solution; or intramuscular injection of some aseptic ergot preparation (1 ampoule) and repeat in an hour, if needed.

Give plenty of water with a demulcent, if there has been irritation of the stomach either from a volatile oil poisoning or from the emetic used.

CLASS III.—DEPRESSANTS OF THE NERVOUS AND CIRCULATORY SYSTEM

The symptoms of poisoning by drugs of this class are, as their name implies, those of circulatory and nervous depression. The pulse is either slow or rapid, but generally weak; the surface of the body generally becomes cold; respirations are slowed; pupils are generally dilated unless the poison is morphin or nicotin; often the patient becomes faint; drowsiness soon develops, and if a narcotic has been taken stupor soon develops; perhaps convulsions will occur; later paralysis and coma.

Immediate Symptoms (if the poison is a depressant of the nervous system):

Depression.

Drowsiness.

Slow, weak pulse.

Slowed respiration.

Paralysis.

Coma.

Later Symptoms:

Muscular weakness.

Circulatory weakness.

Immediate Symptoms (if the poison is a circulatory depressant):

Rapid or slow, weak pulse.

Cardiac anxiety.

Cold, clammy perspiration.

Face pale.

Perhaps convulsions.

Syncope.

TREATMENT

Wash out the stomach (emetics or stomach tube, as see above).

Administer not only the chemical, but a physiologic antidote, if there is such.

Apply dry heat to the body.

If the poison was a narcotic, give cerebral and nervous stimulation, as caffeine (coffee), camphor, atropin, strychnin.

If the poison was a circulatory depressant, give atropin, ergot, epinephrin or strophanthin, as above described.

Compel prolonged mental, circulatory and physical rest.

The accompanying table is arranged alphabetically.

The second column gives the class to which the poison belongs, and the treatment for this class has been given under the headings of the general treatment for each class. Therefore the number of the class to which the poison belongs refers to the treatment there outlined.

Column 3 ("special symptoms") suggests symptoms of poisoning which are characteristic of the drug, such symptoms being in addition to those which are characteristic of the class of poisons to which the drug belongs.

In the fourth column ("special treatment") is indicated any chemical or physiologic antidote that is valuable in treating poisoning by the drug, and is an addition to the general rules discussed above.

TABLE OF SPECIAL SYMPTOMS AND SPECIAL TREATMENT OF VARIOUS POISONS

| Name | Poison Class | Special Symptoms | Special Treatment | Remarks |
|---------------------|----------------|---|--|--|
| Acetanilid | Class III..... | Cyanosis; lowered temperature. | Oxygen inhalations; artificial respiration; sodium bicarbonate. | Chronic poisoning causes anemia. |
| Alcohol (ethyl) .. | Class III..... | | | There may be acute delirium, in which case treat more as Class II. |
| Alcohol (methyl) .. | Class III..... | Often late unless dose is large. | Pilocarpin hydrochlorid in one-eighth gr. dose is recommended; other treatment like Class III. | More or less loss of vision by the third or fourth day. |
| Ammonia | Class I..... | May be swelling and inflammation of the bronchial tubes, hence dyspnea. | Diluted vinegar; lemon juice; olive oil; castor oil. | Stomach-tube contra-indicated. |
| Amyl nitrite..... | Class III..... | Respiratory and cardiac failure. | Artificial respiration; Trendelenburg position. | Treatment of poisoning by other nitrites similar. |
| Anilin | Class III..... | Diarrhea soon occurs; late symptoms are those of Class III; | Tannic acid, one-half teaspoonful in water; later magnesium carbonate. | See treatment for acetanilid. |
| Antimony | Class I..... | circulatory depression. | Sodium bicarbonate. | If much of the poison has been absorbed, fatty degeneration of the organs may develop. |
| Antipyrin | Class III..... | Profuse sweating; lowered temperature. | | See acetanilid. |
| Arsenic | Class I..... | Frontal headache; constriction of the throat; colicky pains; eruptions on the skin. | Official antidote, ferri hydroxidum cum magnesi oxido, 3 oz.; later castor oil. | Renal inflammation is a frequent sequence. |
| Atropin | Class II..... | Flushed face; dilated pupils; dry throat; rapid heart. | Tannic acid; morphin in not too large doses as a partial physiologic antidote. | Catheterize the bladder. |
| Belladonna | Class II..... | | | See atropin. |
| Bromids | Class III..... | | | Treatment similar to chloral. |
| Caffein | Class II..... | | Dry heat to the body. | ..... |
| Camphor | Class II..... |  |  | ..... |
| Cannabis indica.. | Class II..... |  |  | ..... |

| | | | | | |
|----------------------------|------------------|--|--|-------|--|
| Cantharides..... | Class I..... | Kidney and bladder irritation; strangury; abortion. | ..... | ..... | ..... |
| Castor oil beans..... | Class I..... | Collapse. | ..... | ..... | ..... |
| Carbolic acid..... | Class III..... | ..... | ..... | ..... | ..... |
| Chloral | Class III..... | Pupils dilated; coma. | ..... | ..... | ..... |
| Cocain | Class II..... | Pupils dilated; often rapid heart; often cyanosis. | Tannic acid if the drug has entered the stomach. | ..... | See phenol. Inhalations of oxygen; artificial respiration; dry heat; Trendelenburg position. If collapse, Trendelenburg position; if respiratory failure, oxygen and artificial respiration. |
| Codin | Class III..... | ..... | ..... | ..... | See morphin. |
| Creosote | Class III..... | ..... | ..... | ..... | See phenol. |
| Chromic acid..... | Class I..... | Often cramps in the legs. | Chalk; lime water; magnesia. | ..... | Correct name, chromium trioxid. |
| Cyanids | Class I and III. | May act like hydrocyanic acid; may cause stomach symptoms. | ..... | ..... | See hydrocyanic acid. |
| Digitalis | Class III..... | The cerebrum not much affected. | Tannic acid; nitroglycerin hypodermically. | ..... | ..... |
| Ergot | Class III..... | Pupils dilated; cold surface of body; circulatory depression. | Alcohol; nitroglycerin. | ..... | ..... |
| Formaldehyd solution | Class I..... | ..... | If swallowed, very weak solutions of ammonia; diluted aromatic spirits of ammonia. | ..... | If inhaled or taken in strong solution, danger of edema of the glottis. |
| Gelsemium | Class III..... | ..... | Lime water; magnesia. | ..... | Emetics and stomach-tube should not be used. Avoid chalk and alkaline carbonates. |
| Hydrochloric acid | Class I..... | Lips and mouth show white eschar. | ..... | ..... | ..... |
| Hydrocyanic acid | Class III..... | Odor of almonds; respiration and heart fail immediately. | Patient on back with feet raised; artificial respiration; ammonia inhalations; camphor and atropin injections; wash stomach. | ..... | ..... |
| Hyoscyamus | Class II..... | ..... | ..... | ..... | ..... |
| Iodoform | Class II and III | May be symptoms of nervous excitation, with fever; later, prostration. | ..... | ..... | See atropin. |

TABLE OF SPECIAL SYMPTOMS AND SPECIAL TREATMENT OF VARIOUS POISONS—(Continued)

| Name | Poison Class | Special Symptoms | Special Treatment | Remarks |
|--------------------------------------|----------------|--|---|---|
| Lead acetate..... | Class I..... | Colic; muscle cramps; convulsions; stupor; coma. | Dilute hydrochloric, a teaspoonful well diluted; magnesium or sodium sulphate 30 grams (1 ounce). | Later, multiple neuritis. |
| Lobelia | Class III..... | ..... | ..... | ..... |
| Matches | Class I..... | ..... | ..... | ..... |
| Mercuric chlorid (cor. sublimate) | Class I..... | Convulsions; coma; collapse. | Raw eggs and albumin water. | See phosphorus. Late symptoms are salivation; nephritis; multiple neuritis. |
| Morphin | Class III..... | ..... | ..... | ..... |
| Muriatic acid..... | Class I..... | ..... | ..... | See opium. See hydrochloric acid. |
| Nicotin | Class III..... | ..... | ..... | See tobacco. |
| Nitric acid | Class III..... | Mouth and lips may be stained yellow. | ..... | See remarks under hydrochloric acid. |
| Nitroglycerin | Class III..... | ..... | ..... | See amyl nitrite. |
| Optium | Class III..... | Pupils contracted; respiration slowed. | Tannic acid; atropin; wash stomach with potassium permanganate solution 1 part to 1,000. | Catheterize the bladder and wash out stomach frequently; artificial respiration as long as heart continues to beat. |
| Oxalic acid | Class I..... | Depressed circulation; cyanosis. | Magnesia; chalk; later, magnesium sulphate as cathartic. | Alkalies and alkaline carbonates are contra-indicated. |
| Paraldehyd | Class III..... | ..... | ..... | ..... |
| Phenacetin | Class III..... | Lowered temperature. | Sodium bicarbonate. | See acetanilid. |
| Phenol | Class III..... | If solution is strong, white eschar on lips and mouth; collapse; coma; urine black after standing. | Dilute alcohol 1 part to 4, or clear whisky or brandy; sodium sulphate in solution. | Avoid all oils and fats. |
| Physostigma | Class III..... | Pupils contracted; may cause vomiting and purging. | ..... | ..... |

| | | | | |
|--------------------------------|------------------|---|---|--|
| Physostigmin (eserin) | Class III..... | ..... | Tannic acid. Strychnin is a physi- ologic antidote. | See physostigma. |
| Phosphorus | Class I..... | Breath smells garlicky. Most seri- ous symptoms sometimes slow in developing. | Use copper sulphate as emetic; wash stomach with 1-1,000 po- tassium permanganate solution. Later, magnesium sulphate. | Avoid all oils. If much absorp- tion, likely to cause serious liver and kidney inflammation. |
| Pilocarpin | Class III..... | ..... | Tannic acid; atropin hypoderm. | ..... |
| Potass. chlorate.... | Class I..... | ..... | ..... | Nephritis a frequent sequela. |
| Potass. hydrate.... | Class III..... | ..... | ..... | See ammonia. |
| Prussic acid..... | Class I..... | ..... | ..... | See hydrocyanic acid. |
| Ratsbane | Class I..... | ..... | ..... | See phosphorus. |
| Resorcin | Class III..... | ..... | ..... | See phenol. |
| Rough-on-rats .. | Class I..... | ..... | ..... | See arsenic. |
| Salicylic acid .. | Class II..... | ..... | ..... | If taken in concentrated form, treat stomach as in Class I. |
| Salol | Class III..... | ..... | ..... | See phenol. |
| Santonin | Class III..... | ..... | ..... | May be delirium and convulsions. |
| Scopolamin | Class II and III | May act like atropin, but may cause circulatory depression. | ..... | See atropin. |
| (hyoscin) ..... | ..... | ..... | Sodium chlorid (salt solution). | ..... |
| Silver nitrate.... | Class I..... | ..... | ..... | See ammonia. |
| Sodium hydrate.. | Class II..... | ..... | Nitroglycerin. | See atropin. |
| Stramonium | Class III..... | ..... | Sodium bicarbonate; later, mag- nesium sulphate. | ..... |
| Strophanthus | Class III..... | May cause ptosis, suppression of the urine, and papular skin eruptions. | ..... | Treatment quite similar to ace- tamilid. |
| Sulphonal ..... | ..... | Lips and mouth may show black eschar. | ..... | See remarks under hydrochloric acid. |
| Sulphuric acid... | Class III..... | Prostration. | Tannic acid if tobacco or nicotin has been swallowed. | Trendelenburg position. |
| Tobacco | Class III..... | ..... | ..... | See sulphonal. |
| Trional | Class III..... | ..... | ..... | See aconite. |
| Veratrum | Class III..... | ..... | ..... | See sulphonal. |
| Veronal | Class III..... | ..... | ..... | ..... |

NEW AND NONOFFICIAL REMEDIES

The following substances have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies to Jan. 1, 1915. Not all of the preparations on the market of each drug, serum, tuberculin or vaccine are enumerated here. For the complete list reference should be had to the last edition of New and Nonofficial Remedies.

AGAR AND AGAR PREPARATIONS

Agar-Agar
Phenolphthalein-Agar
Agaric Acid

ALUMINUM COMPOUNDS

Alumnol

ANESTHETICS

Anesthetics, General

Ethyl Bromide
Ethyl Chloride
Kelene
Methyl Chloride
Liquid Nitrous Oxide

Anesthetics, Local

Alypin
Anesthesin
Beta-Eucaine Hydrochloride
Beta-Eucaine Lactate
Cycloform
Neurocaine
Novocaine
Novocaine Nitrate
Orthoform—New
Orthoform—New Hydrochloride
Propacsin
Stovaine
Tropacocaine Hydrochloride

ANTHRASOL AND SIMILAR TAR PRODUCTS

Anthrasol

ANTITHYROID PREPARATIONS

Antithyroidin-Moebius
Thyreoidectin
Arbutin
Arhovin

ARSENIC AND ARSENIC COMPOUNDS

Arsenic Compounds, Complex-Arsanilates
Arsacetin
Sodium Arsanilate
Atoxyl
Soamin

Arsenic Compounds, Complex-Arsenphenol-Amines

Neosalvarsan
Salvarsan

Arsenic Compounds, Complex-Organic-Cacodylates

Sodium Cacodylate

Arsenic Compounds, Complex-Organic

Arsenoferratin
Arsen-Triferrin
Elarson

ATOPHAN AND ATOPHAN DERIVATIVES

Atophan
Isatophan
Novatophan
Paratophan

ATROPIN DERIVATIVES AND ANALOGUES

Synthetic Mydriatics

Eumydrin
Euphthalmin
Homatropine Hydrochloride
Benzene, Medicinal
Berberine Hydrochloride

BILE SALTS AND BILE SALT COMPOUNDS

Bilein
Bile Salts
Colalin
Glycotauron
Ovogal

BISMUTH COMPOUNDS

Bismuth Compounds, Soluble

Bismon
Bismuth and Iron Citrate (soluble), Wellcome
Brand
Bismuth and Lithium Citrate (soluble) Wellcome
Brand

Bismuth Compounds, Insoluble

Airol
Bismal
Bismuth Betanaphtholate
Cremo-Bismuth
Crurin Purum
Lac Bismo
Tannismuth
Xeroform

BROMINE DERIVATIVES

Adalin
Brometone
Bromipin
Bromo-Mangan
Bromural
Brovalol
Sabromin

CALCIUM SALTS

Calcium Glycerophosphate
Calcium Ichthyol
Calcium Lactate
Calcium Peroxide
Calcium Phenolsulphonate
Cantharidin
Chinosol

**CHLORAL DERIVATIVES
AND SUBSTITUTES**

Butyl-Chloral Hydrate
Chloralformamide
Chloralamid
Chlorbutanol
Chloretone
Methatorm
Solution Amylene-Chloral

CODEINE DERIVATIVES

Eucodin
Guaiacodeine
Compressed Oxygen

COPPER SALTS

Copper Citrate

COTARNINE SALTS

Stypticin
Styptol

**CREOSOTE AND GUAIALCOL
COMPOUNDS**

Benzosol
Creosote Carbonate
Creosotal
Creosotal-Heyden
Guaiacodeine
Guaiacol Carbonate
Duotal
Duotal-Heyden
Guaiacol-Salol
Guaiamar
Gujasanol
Monotal
Styracol

**CRESOL AND CRESOL PREP-
ARATIONS**

Cresol
Disinfectant Krelas, Mul-
ford
Kresamine
Phenoco
Trikesol

CRESOL DERIVATIVES

Cresatin
Europhen
Cypress Oil

**DIETHYL-BARBITURIC ACID
AND COMPOUNDS**

Veronal
Sodium Diethyl-Barbiturate
Medinal

Veronal-Sodium

Luminal
Luminal-Sodium

**DIGITALIS PRINCIPLES AND
PREPARATIONS***Digitalis Principles*

Digitalein, Crude
Digitalin, True
Digitalin, "French"
Digitalin, "German"
Digitoxin

Related Digitalis Principles

Cymarin
Ouabain, Crystallized

Digitalis Preparations

Digipoten
Digipuratum
Digitol
Dolomol
Emetine Hydrochloride
Epicarin

**EPINEPHRINE AND EPI-
NEPHRINE PREPARATIONS**

Epinephrine
Adrenalin
L-Suprarenin Synthetic
L-Suprarenin Synthetic Bi-
tartrate
Purified Extract of Adrenal
Gland
Suprarenal Liquid
Tyramine

**ERGOT PRINCIPLES AND
PREPARATIONS**

Cornutol
Ergotinine Citrate
Extract of Ergot, Purified
Secacornin

**ETHYLENE AMINES AND
DERIVATIVES**

Ethylene Diamine Preparations
Ethylene Diamine
Ethylene Diamine Solution,
10 per cent.
Kresamine
Lysidin

Piperazine Compounds

Piperazine
Lycetol
Sidonal

*Fermentdiagnosticum***FERMENTS, DIGESTIVE***Pancreatic Ferments*

Diazyme Essence
Diazyme Glycerole
Holadin
Panase
Pankreon
Trypsin—Armour
Trypsin—Fairchild

Peptic Ferments

Elixir of Enzymes
Essence of Pepsin—Fair-
child
Pegnin

FILICIC ACID AND RELATED SUBSTANCES

Filmaron
Fluorescein

FORMALDEHYDE PREPARATIONS AND COMPOUNDS WHICH LIBERATE FORMALDEHYDE*Formaldehyde Preparations*

Solution of Formaldehyde
Formalin
Trioxymethylene
Veroform

The Simpler Formaldehyde Compounds

Formicin
Glutol-Schleich

FORMALDEHYDE COMPOUNDS ACTING MAINLY BY THEIR ASSOCIATED CONSTITUENTS

Empyroform
Fortoin
Tannoform

HEXAMETHYLENAMINE AND HEXAMETHYLENAMINE COMPOUNDS

Hexamethylenamine
Aminoform
Formin
Urotropine
Amphotropin
Hexamethylenamine Meth-
ylene Citrate
Helmitol
Hexalet
Saliformin
Tannopin

FORMIC ACID COMPOUNDS

Formic Acid

GLYCEROPHOSPHATES

Calcium Glycerophosphate
Sodium Glycerophosphate
Hediosit

HYDROCHLORIC ACID SUBSTITUTES

Acidol
Oxyntin

HYPOCHLORITES

Antiformin

HYPOPHOSPHITES

Ammonium Hypophosphite
Gardner's Syrup of Chem-
ically Pure Hypophos-
phite of Ammonium

ICHTHYOL AND RELATED COMPOUNDS

Ichthyol
Calcium Ichthyol
Ferrichthyol
Ichthalbin
Ichthargan
Ichthoform
Sodium Ichthyol
Tumenol
Tumenol-Ammonium

IODINE COMPOUNDS*Iodine Dusting Powders*

Airol
Europhen
Iodoformogen
Thymol Iodide
Aristol
Vioform

IODINE COMPOUNDS FOR INTERNAL USE*Protein Compounds*

Iodalbin
Iodo-Casein
Iodo-Mangan

Non-Protein Compounds

Ferro-Sajodin
Iodipin
Iothion
Sajodin

IRON AND IRON COMPOUNDS*Iron Salts, Simple*

Ferripyrrine
Ferropyrine
Ferrous Lactate

Iron Salts, Complex

Arsenoferratin
Arsentriferrin
Bismuth and Iron Citrate
(soluble) Wellcome
Brand
Ferratin
Ferrichthyol
Ferro-Mangan-Dieterich
Ferro-Sajodin
Hemaboloids
Ovoferrin
Proferrin
Triferrin

Iron Salts, Complex-Hemoglobin Derivatives

Hemogallol
Hemol

LACTIC ACID-PRODUCING ORGANISMS AND PREPARATIONS

B. B. Culture
Bacillary Milk
Bulgara Tablets
Culture of Bacillus Bul-
garicus—Fairchild
Culture of Bulgarian Bacil-
lus—Mulford
Kefir Fungi
Lactampoule
Lactic Bacillary Tablets—
Fairchild
Massolin
Lanolin

LECITHIN PREPARATIONS

Glycerole of Lecithin
Lecibrin
Lecithin Solution
Lecithol
Neuro-Lecithin—Abbott

LITHIUM SALTS

Bismuth and Lithium Ci-
trate (soluble) Wellcome
Brand

MANGANESE COMPOUNDS

Bromo-Mangan
Ferro-Mangan

MEDICINAL FOODS

Liquid Mixed Foods
Enemose
Liquid Peptonoids
Panopepton
Pre-Digested Liquid Food
—Mulford

Dry Protein Foods

Ciose
Dry Peptonoids
Erepton
Nutrose

Carbohydrate Foods

Dextri-Maltose, Mead's
Dextrose
Levulose—Schering

Diabetic Foods

Casoid Diabetic Flour
Gluten Food A, Barker's
Gluten Food B, Barker's
Gluten Food C, Barker's
Hepco Flour

Meat Extracts**Meat Juices****MENTHOL COMPOUNDS**

Coryfin
Validol

MERCURY AND MERCURY COMPOUNDS**Mercuric Compounds, Organic**

Afridol
Mercuriol

Mercuric Compounds, Inorganic

Mercuric Benzoate
Mercuric Cyanide
Mercuric Oxycyanide
Mercuric Salicylate
Mercuric Succinimide
Mergal
Potassium Mercuric-Iodide
Soloid Mercuric Potassium
Iodide
Sublamine

Mercurous Compounds

Calomelol

Mercury, Metallic

Electr-HG
Mercurial Ointment, Improved—Mulford

MORPHIN DERIVATIVES

Diacetyl-Morphin
Heroin
Diacetyl-Morphine Hydrochloride
Heroin Hydrochloride
Ethyl-Morphine Hydrochloride
Dionin
Morphine Meconate

NAPHTHOL COMPOUNDS

Alumolol

Betanaphthol Benzoate

Betol

Bismuth Betanaphtholate

Ninhydrin

NITRATES-ORGANIC

Erythrol Tetranitrate

NUCLEINS AND NUCLEIC ACIDS

Nuclein
Nucleic Acid
Sodium Nucleate
Nuclein—Abbott

ORGANS OF ANIMALS**Leukocytes**

Leukocyte Extract
Leucocyte Extract—Squibb

Mammary Gland

Mammary Substance—Armour

Ovary

Ovarian Substance—Armour
Desiccated Corpus Luteum—Armour
Lutein Tablets—H. W. & Co.

Thyroid

Iodothyryne

Parathyroid Gland

Desiccated Parathyroid Gland—Armour

Pituitary Gland

Desiccated Pituitary Substance (Anterior Lobe)—Armour
Desiccated Pituitary Substance (Posterior Lobe)—Armour
Pituitary Body Desiccated—Armour
Pituitary Liquid
Solution Pituitary Extract

Red Bone-Marrow

Extract of Red Bone-Marrow

Thymus Gland

Desiccated Thymus—Armour

Osmium Tetroxide

Oxaphor

PARSLEY-SEED PREPARATIONS

Apiol
Oleoresin of Parsley-Seed

PERBORATE PREPARATIONS

Sodium Perborate
Perogen Bath

PEROXIDES**Hydrogen Peroxide Preparations**

Perhydrol

Metallic Peroxides

Calcium Peroxide
Magnesium Peroxide
Magnesium Perhydrol

PEROXIDES — Metallic — Continued.

Magnesium Perhydrol
Sodium Peroxide
Oxone
Strontium Peroxide
Zinc Peroxide
Peroxide Zinc Soap

Organic Peroxides

Acetozone
Alphozone

PHENETIDIN DERIVATIVES

Acetphenetidin
Phenacetin
Chinaphenin
Eupyrine
Holocaine Hydrochloride
Lactophenin
Phenocoll Hydrochloride
Phenocoll Salicylate
Salophen
Thermodin
Triphenin

PHENOCOLL COMPOUNDS

Phenocoll Hydrochloride
Phenocoll Salicylate
Phenolphthalein

PHENOLSULPHONATES

Calcium Phenolsulphonate
Phenolsulphonophthalein
Phenolsulphonophthalein —
H. W. & Co.

Phloridzin
Picric Acid
Placentapepton

Pollantin, Fall
Pollantin Powder, Fall

PYRAZOLON DERIVATIVES*Antipyrine Compounds and Derivatives*

Antipyrine Salicylate
Salipyrin
Melubrin
Ferripyrene
Ferropyrine

Pyramidon and Pyramidon Compounds

Pyramidon
Pyramidon Acid Camphorate
Pyramidon Neutral Camphorate
Pyramidon Salicylate

PYROGALLOL DERIVATIVES

Eugallol
Pyroxylin
Celloidin

QUININE DERIVATIVES

Aristochin
Chinaphenin
Euquinine
Quinine Lygosinate
Quinine Tannate
Quinine and Urea Hydrochloride
Saloquinine
Saloquinine Salicylate

RADIUM AND RADIUM SALTS

Radium Bromide
Radium Carbonate
Radium Chloride
Radium Sulphate

RESORCIN COMPOUNDS

Euresol

SALICYLIC ACID COMPOUNDS*Acid Derivatives of Salicylic Acid (Acetylsalicylic Acid Type)*

Aspirin
Diaspirin
Diplosal
Novaspirin

Alkyl Derivatives of Salicylic Acid (Methyl-Salicylate Type)

Benzosalin
Ethyl Salicylate
Sal-Ethyl
Mesotan
Spirosal

Phenol Derivatives of Salicylic Acid (Salol Type)

Betol
Guaiacol-Salol
Salophen

Salicylic Compounds in Which the Salicylate Action is Subordinate

Antipyrine Salicylate and Salipyrin
Mercuric Salicylate
Phenocoll Salicylate
Saliformin
Saloquinine
Saloquinine Salicylate
Santyl

SANDALWOOD OIL DERIVATIVES

Arrheol
Carbosant
Santyl
Thyresol
Scarlet R Medicinal, Biebrich

SCOPOLAMINE

Euscolol

SERUMS AND VACCINES*I. Antibodies Used for Prophylactic or Therapeutic Purposes*

Normal Horse-Serum
Diphtheria Antitoxin Unconcentrated
Diphtheria Antitoxin Concentrated
Diphtheria Antitoxin, Dried
Tetanus Antitoxin, Unconcentrated
Tetanus Antitoxin, Concentrated
Tetanus Antitoxin, Dried
Anti-Anthrax Serum

SERUMS AND VACCINES—**Antibodies—Continued.**

Antidysenteric Serum
 Antigonococcus Serum
 Antimeningococcus Serum
 Antipneumococcus Serum
 Antistaphylococcus Serum
 Antistreptococcus Serum

II. Antigens Used for Prophylactic or Therapeutic Purposes

Vaccine Virus—Virus Vaccinium
 Antirabic Vaccine
 Old Tuberculin
 New Tuberculin, T. R.
 New Tuberculin, B. E.
 Tuberculin Denys, B. F.
 Detre Differential Test
 Tuberculosis Serum Vaccine, S. B. E.
 Dixon's Tubercle Bacilli Extract
 Dixon's Suspension of Dead Tubercle Bacilli
 Tuberculin—Rosenbach
 Acne Bacillus Vaccine
 Cholera Vaccine
 Colon Bacillus Vaccine
 Diphtheria Bacillus Vaccine
 Friedlaender Bacillus Vaccine
 Gonococcus Vaccine
 Meningococcus Vaccine
 Micrococcus Neoformans Vaccine
 Pertussis Bacillus Vaccine
 Plague Bacillus Vaccine
 Pneumococcus Vaccine
 Pyocyaneus Bacillus Vaccine
 Staphylococcus Vaccines
 Streptococcus Vaccine
 Typhoid Vaccine
 Erysipelas and Prodigiosus Toxins

III. Diagnostic Agents

Bass Modification of the Widal Test
 Borden's Modification of the Widal Test
 Noguchi Modification of the Wassermann Test
 Luetin
 Silk Peptone "Hoechst"

SILVER COMPOUNDS**Silver Salts, Simple**

Albargin
 Argentamin
 Silver Citrate
 Antiseptic-Crede
 Silver Lactate
 Silver Lactate-Crede

Silver Salts, Complex

Argonin
 Argyrol
 Hegonon
 Ichthargan
 Novargan
 Protargol
 Sophol

Silver Preparations, Colloidal

Cargentos
 Collargol
 Electrargol
 Sodium Acid Phosphate
 Sodium Lygosinate
 Sodium Oleate
 Sodium Succinate, Exsiccated

SULPHANILATES

Sulphanilic Acid
 Soloid Nizin

SULPHONE METHANES

Sulphonmethane
 Sulphonal
 Sulphonethylmethane
 Trional
 Sulphurated Potash

SULPHUR COMPOUNDS

Calcium Ichthyol
 Ferrichthyol
 Ichthalbin
 Ichthargan
 Ichthoform
 Ichthyol
 Sodium Ichthyol
 Thigenol
 Thiol
 Tumenol
 Tumenol Ammonium

TANNIC AND GALLIC ACID DERIVATIVES**Tannic Acid Derivatives**

Protan
 Tannalbin
 Tannigen
 Tannismuth
 Tannoform
 Tannopin

Galic Acid Derivatives

Airol
 Bismal
 Gallogen
 Lenigallol

TERPINE DERIVATIVES

Apinol
 Oil of Pine Needles

THIOSINAMINE AND THIO-SINAMINE COMPOUNDS

Thiosinamine
 Fibrolysin

UREASE

Arleo-Urease
 Urease-Dunning

URETHANES (CARBAMATES).**UREA AND UREIDS**

Adalin
 Ethyl Carbamate
 Urethane
 Urethan—Hoechst
 Euphorin
 Hedonal
 Thermodin
 Urea
 Veronal

VALERIC ESTERS

Amyl Valerate
 Bromural
 Brovalol
 Validol
 Validol Camphoratum
 Valyl

Borneol Valerates

Bornyval
 New-Bornyval
 Gynoval

XANTHINE DERIVATIVES

Theobromine and Theobromine Compounds

Theobromine
 Agurin
 Theobromine Sodium Salicylate

Thephorin

Uropherin—B.

Uropherin—S.

Theophyllin and Theophyllin Compounds

Theophyllin

Theophyllin—Boehringer

Theocin

Theophyllin Sodio-Acetate

Acet-Theocin Sodium

Acet-Theophyllin Sodium

YEAST PREPARATIONS

Cerolin

Xerase

ZINC COMPOUNDS

Zinc Permanganate

Zinc Peroxide

USEFUL DRUGS

A book has been prepared by the Council on Pharmacy and Chemistry, entitled "Useful Drugs." It discusses a selected list of remedies, including only those drugs which usage has proved are efficient and reliable. A list of these drugs follows:

Acacia.—Acacia, U. S. P.

Mucilago Acaciae.—Mucilage of Acacia, U. S. P.

Acetanilidum.—Acetanilid, U. S. P. Dosage: 0.20 gm. or 3 grains.

Acetphenetidinum.—Acetphenetidin, U. S. P. Dosage: 0.50 gm. or 7½ grains.

Acidum Aceticum.—Acetic Acid, U. S. P.

Diluted Acetic Acid, U. S. P.

Acidum Acetylsalicylicum.—See under Aspirin.

Acidum Benzoicum.—Benzoic Acid, U. S. P. Dosage: 0.5 gm. or 7½ grains.

Glyceritum Boroglycerini.—Glycerite of Boroglycerin, U. S. P.

Unguentum Acidi Borici.—Ointment of Boric Acid, U. S. P.

Acidum Citricum.—Citric Acid, U. S. P. Dosage: 0.5 gm. or 7½ grains.

Acidum Diethylbarbituricum.—See under Veronal.

Acidum Hydrochloricum.—Hydrochloric Acid, U. S. P.

Acidum Hydrochloricum Dilutum.—Diluted Hydrochloric Acid, U. S. P.
Dosage: 1 c.c. or 15 minims.

Acidum Hydrocyanicum Dilutum.—Diluted Hydrocyanic Acid, U. S. P.
Dosage: 0.1 c.c. or 1.5 minims.

Acid Nitricum.—Nitric Acid, U. S. P.

Acidum Picricum.—Picric Acid, N. N. R. (to be added). Dosage: 0.025 to 0.1 gm. or ½ to 2 grains; used locally in 1 per cent. solution.

Acidum Salicylicum.—Salicylic Acid, U. S. P. Dosage: 0.5 gm. or 7½ grains.

Acidum Tannicum.—Tannic Acid, U. S. P. Dosage: 0.3 gm. or 5 grains.

Glyceritum Acidi Tannici.—Glycerite of Tannic Acid, U. S. P. Dosage: 1 c.c. or 15 minims.

Tannalbin.—Tannalbin, N. N. R. Dosage: 2 gm. or 30 grains.

Aconitum.—Aconite, U. S. P.

Tinctura Aconiti.—Tincture of Aconite, U. S. P. Dosage: 0.2 c.c. or 3 minims.

Adeps.—Lard, U. S. P.

Adeps Benzoinatus.—Benzoinated Lard, U. S. P.

Adeps Lanae Hydrosus.—Hydrous Wool Fat, U. S. P.

Adrenalin.—See Epinephrine.

Aether.—Ether, U. S. P. Dosage: 1 c.c. or 15 minims.

Spiritus Aetheris, U. S. P. Dosage: 4 c.c. or 1 fluidram.

Spiritus Aetheris Compositus. U. S. P. (to be deleted). Dosage: 4 c.c. or 1 fluidram.

Aether Nitrosus.—Used only in the form of

Spiritus Aetheris Nitrosi.—Spirit of Nitrous Ether, U. S. P. Dosage: 2 c.c. or 30 minims.

Aethylis Chloridum.—Ethyl Chloride, U. S. P.

Aethyl-Morphinae Hydrochloridum.—Ethyl-Morphin Hydrochloride, N. N. R. Dionin. Dosage: 0.015 gm. or ¼ grain.

Alcohol.—Alcohol, U. S. P.

Elixir Aromaticum.—Aromatic Elixir, U. S. P.

- Aloes**.—Aloe, U. S. P. Dosage: 0.15 to 0.3 gm. or 2 to 5 grains, purgative; 0.03 to 0.05 gm. or $\frac{1}{2}$ to 1 grain, laxative.
- Extractum Aloes**.—Extract of Aloes, U. S. P. Dosage: 0.10 gm. or 2 grains.
- Alcinum**.—Alcin, U. S. P. Dosage: 0.05 gm. or 1 grain.
- Alumen**.—Alum, U. S. P.
- Alumen Exsiccatum**.—Exsiccated Alum, U. S. P.
- Alumini Acetas**.—Aluminum Acetate.
- Liquor Alumini Acetatis**.—Solution of Aluminum Acetate, N. F.
- Ammonia**.
- Aqua Ammoniac**.—Ammonia Water, U. S. P.
- Linimentum Ammoniac**.—Ammonia Liniment, U. S. P.
- Ammonii Acetas**.—Ammonium Acetate.
- Liquor Ammonii Acetatis**.—Solution of Ammonium Acetate, U. S. P. Dosage: 15 c.c. or 4 fluidrams.
- Ammonii Carbonas**.—Ammonium Carbonate, U. S. P. Dosage: 0.25 gm. or 4 grains.
- Spiritus Ammoniac Aromaticus**.—Aromatic Spirit of Ammonia, U. S. P. Dosage: 1 to 5 c.c. or 15 to 60 minims.
- Ammonii Chloridum**.—Ammonium Chloride, U. S. P. Dosage: 0.30 to 1 gm. or 5 to 15 grains.
- Amyli Nitris**.—Amyl Nitrite, U. S. P. Dosage: 0.2 c.c. or 3 minims, by inhalation.
- Amylum**.—Starch, Corn Starch, U. S. P.
- Antimonii et Potassii Tartras**.—Antimony and Potassium Tartrate, U. S. P. Dosage: 0.001 gm. or $\frac{1}{60}$ grain.
- Vinum Antimonii**.—Wine of Antimony, U. S. P. Dosage: 1 c.c. or 15 minims (0.004 gm. or $\frac{1}{15}$ grain tartar emetic).
- Apomorphinae Hydrochloridum**.—Apomorphine Hydrochloride, U. S. P. Dosage: expectorant 0.002 gm. or $\frac{1}{30}$ grain, emetic 0.005 gm. or $\frac{1}{10}$ grain.
- Antipyrina**.—Antipyrine, U. S. P. Dosage: 0.25 gm. or 4 grains.
- Aqua**.—Water, U. S. P.
- Aqua Destillata**.—Distilled Water, U. S. P.
- Argenti Nitras**.—Silver Nitrate, U. S. P. Dosage: 0.01 gm. or $\frac{1}{5}$ grain.
- Argenti Nitras Fusus**.—Molded Silver Nitrate, U. S. P.
- Argenti Proteinat**.—Silver Proteinat. See Protargol, N. N. R.
- Aristol**.—See Thymolis Iodidum.
- Arseni Trioxidum**.—Arsenic Trioxide, U. S. P. Dosage: 0.002 gm. or $\frac{1}{30}$ grain.
- Liquor Acidi Arsenosi**.—Solution of Arsenous Acid, U. S. P. Dosage: 0.2 c.c. or 3 minims.
- Liquor Arseni et Hydrargyri Iodidi**.—Solution of Arsenous and Mercuric Iodids, U. S. P. Dosage: 0.1 c.c. or $\frac{1}{2}$ minims.
- Liquor Potassii Arsenitis**.—Solution of potassium Arsenite, U. S. P. Dosage: 0.2 c.c. or 3 minims.
- Asafoetida**.—Asafoetida, U. S. P. Dosage: 0.25 gm. or 4 grains.
- Aspidium**.—Aspidium, U. S. P.
- Oleoresina Aspidii**.—Oleoresin of Aspidium, U. S. P. Dosage: 2 gm. or 30 grains.
- Aspirin**.—Aspirin, N. N. R. Dosage: 0.3 to 1 gm. or 5 to 15 grains.
- Atophan**.—Atophan, N. N. R. (to be added). Dosage: 0.5 to 1 gm. or $7\frac{1}{2}$ to 15 grains.
- Atoxyl**.—See Sodii Arsanillas.
- Atropina**.—Atropine, U. S. P. Dosage: 0.00025 gm. or $\frac{1}{250}$ gr.
- Atropinae Sulphas**.—Atropine Sulphate, U. S. P. Dosage: 0.4 mg. or $\frac{1}{160}$ grain.
- Bacterial Vaccines**.—See Vaccines.
- Balsamum Peruvianum**.—Balsam of Peru, U. S. P.
- Balsamum Tolutanum**.—Balsam of Tolu, U. S. P.
- Syrupus Tolutanus**.—Syrup of Tolu, U. S. P. Dosage: 16 c.c. or 4 fluidrams.

Belladonnae Folia.—Belladonna Leaves, U. S. P.

Tinctura Belladonnae Foliorum.—Tincture of Belladonna Leaves, U. S. P. Dosage: 0.5 c.c. or 8 minims.

Extractum Belladonnae Foliorum.—Extract of Belladonna Leaves, U. S. P. Dosage: 0.01 gm. or 1/5 grain.

Emplastrum Belladonnae.—Belladonna Plaster, U. S. P.

Unguentum Belladonnae.—Belladonna Ointment, U. S. P.

Benzoinum.—Benzoin, U. S. P.

Tinctura Benzoinae Composita.—Compound Tincture of Benzoin, U. S. P.

Benzosulphinidum.—Benzosulphinide, Saccharin, U. S. P. Dosage: 0.2 gm. or 3 grains.

Betanaphthol.—Betanaphthol, U. S. P. Dosage: 0.1 to 0.3 gm. or 2 to 5 grains.

Bismuthi Subcarbonas.—Bismuth Subcarbonate, U. S. P. Dosage: 1 gm. or 15 grains.

Bismuthi Subgallas.—Bismuth Subgallate, U. S. P. Dosage: 0.25 gm. or 4 grains.

Bismuthi Subnitras.—Bismuth Subnitrate, U. S. P. Dosage: 1 gm. or 15 grains.

Bismuthi Subsalcylas.—Bismuth Subsalcylate, U. S. P. Dosage: 0.25 gm. or 4 grains.

Caffeina.—Caffeine, U. S. P. Dosage: 0.06 gm. to 0.3 gm. or 1 to 5 grains.

Caffeina Citrata.—Citric Acid Caffeine, U. S. P. Dosage: 0.1 gm. or 2 grains.

Caffeinae Sodio-Benzoeas.—Caffeine Sodio-Benzoeate, N. F. Dosage: 0.10 gm. or 2 grains.

Calcii Carbonas Praecipitatus.—Precipitated Calcium Carbonate, U. S. P. Dosage: 1 to 3 gm. or 15 to 45 grains.

Calcii Chloridum.—Calcium Chloride, U. S. P. Dosage: 0.5 gm. or 7½ grains.

Calcii Hypophosphis.—Calcium Hypophosphite, U. S. P. (to be deleted). Dosage: 0.5 gm. or 7½ grains.

Calcii Lactas.—Calcium Lactate, N. N. R. Dosage: 0.5 gm. or 7½ grains.

Calcii Phosphas Praecipitatus.—Precipitated Calcium Phosphate, U. S. P. (to be deleted). Dosage: 1 gm. or 15 grains.

Calx.—Calcium Oxide, U. S. P.

Liquor Calcis.—Solution of Calcium Hydroxide, U. S. P. Dosage: 15 c.c. or 4 fluidrams.

Linimentum Calcis.—Lime Liniment, U. S. P.

Calx Chlorinata.—Chlorinated Lime, Chlorinated Calcium Oxide, U. S. P.

Liquor Sodae Chlorinatae.—Solution of Chlorinated Soda, U. S. P. Dosage: 1 c.c. or 15 minims.

Camphora.—Camphor, U. S. P. Dosage: 0.10 gm. or about 2 grains.

Aqua Camphorae.—Camphor Water, U. S. P. Dosage: 10 c.c. or 2 fluidrams.

Spiritus Camphorae.—Spirit of Camphor, U. S. P. Dosage: 1 c.c. or 15 minims.

Linimentum Camphorae.—Camphor Liniment, U. S. P.

Cannabis Indica.—Indian Cannabis, U. S. P. (to be deleted).

Extractum Cannabis Indicae.—Extract of Indian Cannabis, U. S. P. (to be deleted). Dosage: 0.01 gm. or 1/5 grain.

Tinctura Cannabis Indicae.—Tincture of Indian Cannabis, U. S. P. (to be deleted). Dosage: 0.5 c.c. or about 8 minims.

Cantharis.—Cantharides, U. S. P.

Ceratum Cantharidis.—Cantharides Cerate, U. S. P.

Capsicum.—Capsicum, U. S. P. Dosage: 0.05 gm. or about 1 grain.

Tinctura Capsici.—Tincture of Capsicum, U. S. P. Dosage: 0.5 c.c. or 7½ minims.

Carbo Ligni.—Charcoal, U. S. P. Dosage: 1 gm. or 15 grains.

Cardamomum.—Cardamom, U. S. P.

Tinctura Cardamomi.—Tincture of Cardamom. Dosage: 5 c.c. or 1 fluidram.

Caryophyllus.—Cloves, U. S. P.

Oleum Caryophylli.—Oil of Cloves, U. S. P. Dosage: 0.2 c.c. or 3 minims.

Cera Alba.—White Wax, U. S. P., is the bleached form of

Cera Flava.—Yellow Wax, U. S. P.

Chenopodii Oleum.—Oil of Chenopodium, U. S. P. (to be added). Dosage: 0.2 c.c. or 3 minims.

Chloralum Hydratum.—Hydrated Chloral, U. S. P. Dosage: 0.30 to 1.30 gm. or 5 to 20 grains.

Chloroform.—Chloroform, U. S. P. Dosage: 0.05 to 0.3 c.c. or 1 to 5 minims.

Aqua Chloroformi.—Chloroform Water, U. S. P. Dosage: 15 c.c. or 4 fluidrams.

Spiritus Chloroformi.—Spirit of Chloroform, U. S. P. Dosage: 2 c.c. or 30 minims.

Linimentum Chloroformi.—Chloroform Liniment, U. S. P.

Chromii Trioxidum.—Chromium Trioxide, U. S. P.

Chrysarobinum.—Chrysarobin, U. S. P.

Unguentum Chrysarobini.—Chrysarobin Ointment, U. S. P.

Cinchona.—Cinchona, U. S. P.

Tinctura Cinchonae.—Tincture of Cinchona, U. S. P. Dosage: 4 c.c. or 1 fluidram.

Tinctura Cinchonae Composita.—Compound Tincture of Cinchona, U. S. P. Dosage: 4 c.c. or 1 fluidram.

Cinnamomum.—Cinnamon, U. S. P.

Oleum Cinnamomi.—Oil of Cinnamon, U. S. P. Dosage: 0.05 c.c. or 1 minim.

Aqua Cinnamomi.—Cinnamon Water, U. S. P. Dosage: 15 c.c. or 4 fluidrams.

Cocaina.—Cocaine, U. S. P. Dosage: 0.03 gm. or $\frac{1}{2}$ grain.

Cocainae Hydrochloridum.—Cocaine Hydrochloride, U. S. P. Dosage: 0.03 gm. or $\frac{1}{2}$ grain.

Codeina.—Codeine, U. S. P. Dosage: 0.03 gm. or $\frac{1}{2}$ grain.

Codeinae Phosphas.—Codeine Phosphate, U. S. P. Dosage: 0.03 gm. or $\frac{1}{2}$ grain.

Codeinae Sulphas.—Codeine Sulphate, U. S. P. Dosage: 0.03 gm. or $\frac{1}{2}$ grain.

Colchici Semen.—Colchicum Seed, U. S. P.

Tinctura Colchici Seminis.—Tincture of Colchicum Seed, U. S. P. Dosage: 2 c.c. or 30 minims.

Collodium.—Collodion, U. S. P.

Collodium Flexile.—Flexible Collodion, U. S. P.

Colocynthis.—Colocynth, U. S. P.

Extractum Colocynthis.—Extract of Colocynth, U. S. P. Dosage: 0.03 gm. or $\frac{1}{2}$ grain.

Extractum Colocynthis Compositum.—Compound Extract of Colocynth, U. S. P. Dosage: 0.5 gm. or $7\frac{1}{2}$ grains.

Copaiba.—Copaiba, U. S. P. Dosage: 1 c.c. or 15 minims.

Creosotum.—Creosote, U. S. P. Dosage: 0.2 c.c. or 3 minims.

Cresol.—Cresol, U. S. P. Dosage: 0.05 c.c. or 1 minim.

Liquor Cresolis Compositus.—Compound Solution of Cresol, U. S. P. Dosage: solutions containing 1 to 5 per cent.

Cupri Sulphas.—Copper Sulphate, U. S. P. Dosage: 0.01 gm. or $\frac{1}{5}$ grain, astringent; 0.3 gm. or 5 grains (not repeated), emetic.

Acetyl-Morphinae Hydrochloridum.—Heroin Hydrochloride, N. N. R. Dosage: 3 mg. or $\frac{1}{20}$ grain.

- Digitalls.**—*Digitalis*, U. S. P. Dosage: 0.065 gm. or 1 grain.
Infusum Digitalls.—Infusion of *Digitalls*, U. S. P. Dosage: 8 c.c. or 2 fluidrams.
Tinctura Digitalls.—Tincture of *Digitalls*, U. S. P. Dosage: 1 c.c. or 15 minims.
- Diphtheria Antitoxin.**—See Serum Antidiphthericum.
- Elaterinum.**—*Elaterin*, U. S. P. Dosage: 0.005 gm. or 1/10 grain.
- Emetinae Hydrochloridum.**—*Emetine Hydrochloride*, N. N. R. (to be added). Dosage: 0.03 to 0.45 gm. or from $\frac{1}{4}$ to $\frac{1}{2}$ grain as an amebicide.
- Epinephrine.**—*Epinephrine*, N. N. R. Dosage: 1:10,000 to 1:1,000. Internally, 5 to 10 drops of 1:1,000 solution.
- Ergota.**—*Ergot*, U. S. P. Dosage: 2 gm. or 30 grains.
Fluidextractum Ergotae.—Fluidextract of *Ergot*, U. S. P. Dosage: 2 c.c. or 30 minims.
- Eucalyptus.**—*Eucalyptus*, U. S. P.
Eucalyptol.—*Eucalyptol*, U. S. P. Dosage: 0.3 c.c. or 5 minims.
Oleum Eucalypti.—Oil of *Eucalyptus*, U. S. P. Dosage: 0.5 c.c. or 8 minims.
- Fel Bovis.**—Oxgall, U. S. P.
Fel Bovis Purificatum.—Purified Oxgall, U. S. P. Dosage: 0.5 gm. or $7\frac{1}{2}$ grains.
- Ferri Carbonas.**—Ferrous Carbonate.
Massa Ferri Carbonatis.—Mass of Ferrous Carbonate, U. S. P. Dosage: 0.25 gm. or 4 grains.
Pilulae Ferri Carbonatis.—Pills of Ferrous Carbonate, U. S. P. Dosage: 2 pills.
- Ferri Chloridum.**—Ferric Chloride, U. S. P.
Tinctura Ferri Chloridi.—Tincture of Ferric Chloride, U. S. P. Dosage: 0.5 c.c. or 8 minims.
- Ferri et Ammonii Citras.**—Iron and Ammonium Citrate, U. S. P. Dosage: 0.25 gm. or 4 grains.
- Ferri Iodidum.**—Ferrous Iodide.
Syrupus Ferri Iodidi.—Syrup of Ferrous Iodide, U. S. P. Dosage: 1 c.c. or 15 minims.
- Ferri Phosphas Solubilis.**—Soluble Ferric Phosphate, U. S. P. Dosage: 0.25 gm. or 4 grains.
- Ferri Sulphas.**—Ferrous Sulphate, U. S. P. Dosage: 0.2 gm. or 3 grains.
Ferri Sulphas Exsiccatus.—Exsiccated Ferrous Sulphate, U. S. P.
- Ferrum.**—Iron, U. S. P.
Ferrum Reductum.—Reduced Iron, U. S. P. Dosage: 0.06 gm. or 1 grain.
- Formaldehydum.**—Formaldehyde.
Liquor Formaldehydi.—Solution of Formaldehyde, U. S. P.
- Gelatinum.**—Gelatin, U. S. P.
- Gentiana.**—*Gentian*, U. S. P.
Tinctura Gentianae Composita.—Compound Tincture of *Gentian*, U. S. P. Dosage: 4 c.c. or 1 fluidram.
Extractum Gentianae.—Extract of *Gentian*, U. S. P. Dosage: 0.25 gm. or 4 grains.
- Glandulae Thyroideae Siccæ.**—Desiccated Thyroid Glands, U. S. P. Dosage: 0.05 gm. or 1 grain.
- Glycerinum.**—Glycerin, U. S. P.
Suppositoria Glycerinal.—Suppositories of Glycerin, U. S. P.
- Glycerylls Nitrates.**—*Glyceryl Trinitrate*.
Spiritus Glycerylls Nitratis.—Spirit of *Glyceryl Trinitrate*, U. S. P. Dosage: 0.05 c.c. or 1 minim.

Glycyrrhiza.—*Glycyrrhiza*, Licorice Root, U. S. P.

Fluidextractum Glycyrrhizae.—Fluidextract of *Glycyrrhiza*, U. S. P.
Dosage: 2 c.c. or 30 minims.

Pulvis Glycyrrhizae Compositus.—Compound Powder of *Glycyrrhiza*, U. S. P. Dosage: 4 gm. or 60 grains.

Guaiacol.—*Guaiacol*, U. S. P. Dosage: 0.1 to 0.6 c.c. or 1½ minims to 10 minims.

Guaicolis Carbonas.—*Guaiacol Carbonate*, U. S. P. Dosage: 1 gm. or 15 grains.

Heroin Hydrochloride.—See *Diacetylmorphinae Hydrochloridum*.

Hexamethylenamina.—*Hexamethylenamine*, U. S. P. Dosage: 0.3 gm. or 5 grains.

Homatropinae Hydrobromidum.—*Homatropine Hydrobromide*, U. S. P.
Dosage: 0.0095 gm. or 1/125 grain.

Hydrargyri Chloridum Corrosivum.—*Corrosive Mercuric Chloride*, U. S. P.
Dosage: 0.002 to 0.01 gm. or 1/30 to 1/6 grain.

Hydrargyri Chloridum Mite.—*Mild Mercurous Chloride*, U. S. P. Dosage: 0.005 to 0.02 gm. or 1/10 to 1/3 grain.

Hydrargyri Iodidum Flavum.—*Yellow Mercurous Iodide*, U. S. P. Dosage: 0.015 gm. or ¼ grain.

Hydrargyri Iodidum Rubrum.—*Red Mercuric Iodide*, U. S. P. Dosage: 0.003 or 1/20 grain.

Hydrargyri Oxidum Flavum.—*Yellow Mercuric Oxide*, U. S. P. Dosage: 0.5 to 2 per cent. ointment.

Unguentum Hydrargyri Oxidi Flavi.—*Ointment of Yellow Mercuric Oxide*, U. S. P. Dosage: It should be diluted with from 10 to 100 parts of petrolatum.

Hydrargyri Salicylas.—*Mercuric Salicylate*, N. N. R. Dosage: 0.6 c.c. or 10 minims of a 10 per cent. suspension in liquid paraffin.

Hydrargyrum.—*Mercury*, U. S. P.

Hydrargyrum cum Creta.—*Mercury with Chalk*, U. S. P. Dosage: 0.250 gm. or 4 grains.

Massa Hydrargyri.—*Mass of Mercury*, U. S. P. Dosage: 0.250 gm. or 4 grains.

Unguentum Hydrargyri.—*Mercurial Ointment*, U. S. P.

Unguentum Hydrargyri Dilutum.—*Blue Ointment*, U. S. P. Dosage: 2 gm. or 30 grains.

Hydrargyrum Ammoniatum.—*Ammoniated Mercury*, U. S. P.

Unguentum Hydrargyri Ammoniatum.—*Ointment of Ammoniated Mercury*, U. S. P.

Hydrastis.—*Hydrastis*, U. S. P.

Fluidextractum Hydrastis.—*Fluidextract of Hydrastis*, U. S. P. Dosage: 2 c.c. or 30 minims.

Hydrogenii Dioxidum.—*Hydrogen Dioxide*.

Aqua Hydrogenii Dioxidum.—*Solution of Hydrogen Dioxide*, U. S. P.
Dosage: Apply diluted with four volumes of water.

Hyoscyamus.—*Hyoscyamus*, U. S. P.

Tinctura Hyoscyami.—*Tincture of Hyoscyamus*, U. S. P. Dosage: 0.6 to 2 c.c. or 10 to 30 minims.

Ichthyol.—*Ichthyol*, N. N. R. Dosage: 0.2 to 2 c.c. or 3 to 30 minims.

Iodoformum.—*Iodoform*, U. S. P. Dosage: 0.25 gm. or 4 grains.

Iodum.—*Iodine*, U. S. P.

Tinctura Iodi.—*Tincture of Iodine*, U. S. P. Dosage: 0.1 c.c. or 1½ minims.

Ipecacuanha.—*Ipecac*, U. S. P. Dosage: 0.05 gm. or 1 grain, expectorant; 1 gm. or 15 grains, emetic.

Fluidextractum Ipecacuanhae.—*Fluidextract of Ipecac*, U. S. P. Dosage: 1 c.c. or 15 minims, emetic; 0.05 c.c. or 1 minim, expectorant.

Syrupus Ipecacuanhae.—*Syrup of Ipecac*, U. S. P. Dosage: 0.25 c.c. or 4 minims, expectorant; 15 c.c. or 4 fluidrams, emetic.

- Jalapa.**—Jalap, U. S. P. Dosage: 1 gm. or 15 grains.
Pulvis Jalapae Compositus.—Compound Powder of Jalap, U. S. P.
Dosage: 2 gm. or 30 grains.
- Linum.**—Flaxseed, U. S. P.
Oleum Lini.—Linseed Oil, U. S. P. Dosage: 30 c.c. or 1 fluidounce.
- Lobelia.**—Lobelia, U. S. P.
Tinctura Lobellae.—Tincture of Lobelia, U. S. P. Dosage: 0.5 c.c. to 1.5 c.c. or 10 to 20 minims.
- Magnesi Carbonas.**—Magnesium Carbonate, U. S. P. Dosage: 3 gm. or 45 grains.
- Magnesi Citras.**—Magnesium Citrate.
Liquor Magnesi Citratis.—Solution of Magnesium Citrate, U. S. P.
Dosage: 360 c.c. or 12 fluidounces.
- Magnesi Oxidum.**—Magnesium Oxide, U. S. P. Dosage: 0.6 to 3 gm. or 10 to 45 grains.
- Magnesi Sulphas.**—Magnesium Sulphate, U. S. P. Dosage: 15 gm. or 240 grains.
Magnesi Sulphas Effervescens.—Effervescent Magnesium Sulphate, U. S. P. Dosage: 15 gm. or 240 grains.
- Mentha Piperita.**—Peppermint, U. S. P.
Oleum Menthae Piperitae.—Oil of Peppermint, U. S. P. Dosage: 0.2 c.c. or 3 minims.
Spiritus Menthae Piperitae.—Spirit of Peppermint, U. S. P. Dosage: 2 c.c. or 30 minims.
Aqua Menthae Piperitae.—Peppermint Water, U. S. P. Dosage: 16 c.c. or 4 fluidrams.
- Menthol.**—Menthol, U. S. P. Dosage: 0.065 gm. or 1 grain.
- Methylis Salicylas.**—Methyl Salicylate, U. S. P. Dosage: 1 c.c. or 15 minims.
Oleum Betulae.—Oil of Betula, U. S. P.
Oleum Gaultheriae.—Oil of Gaultheria, U. S. P.
- Morphina.**—Morphine, U. S. P. Dosage: 0.01 gm. or 1/6 grain.
Morphinae Hydrochloridum.—Morphine Hydrochloride, U. S. P. Dosage: 0.01 gm. or 1/6 grain.
Morphinae Sulphas.—Morphine Sulphate, U. S. P. Dosage: 0.01 gm. or 1/6 grain.
- Morrhuae Oleum.**—Cod-Liver Oil, U. S. P. Dosage: 1 dram to 1 ounce.
- Myrrha.**—Myrrh, U. S. P. Dosage: 0.5 gm. or 7½ grains.
Tinctura Myrrhae.—Tincture of Myrrh, U. S. P. Dosage: 1 c.c. or 15 minims.
- Nux Vomica.**—Nux Vomica, U. S. P.
Extractum Nuclei Vomicae.—Extract of Nux Vomica, U. S. P. Dosage: 0.015 gm. or ¼ grain.
Tinctura Nuclei Vomicae.—Tincture of Nux Vomica, U. S. P. Dosage: 0.6 c.c. or 10 minims.
- Opium.**—Opium, U. S. P.
Opil Pulvis.—Powdered Opium, U. S. P. Dosage, 0.065 gm. or 1 grain.
Extractum Opil.—Extract of Opium, U. S. P. Dosage: 0.03 gm. or ½ grain.
Tinctura Opil.—Tincture of Opium, Laudanum, U. S. P. Dosage: 0.5 c.c. or 8 minims.
Tinctura Opil Deodorati.—Tincture of Deodorized Opium, U. S. P. Dosage: 0.5 c.c. or 8 minims.
Tinctura Opil Camphorata.—Camphorated Tincture of Opium, Paregoric, U. S. P. Dosage: 8 c.c. or 2 fluidrams.
Pulvis Ipecacuanhae et Opil.—Powder of Ipecac and Opium, U. S. P. Dosage: 0.5 gm. or 7½ grains.
- Oxygenium Compressum.**—Compressed Oxygen, N. N. R.
- Pancreatinum.**—Pancreatin, U. S. P. Dosage: 0.5 gm. or 7½ grains.

Paraffinum.—Paraffin, U. S. P.

Paraldehydum.—Paraldehyde, U. S. P. Dosage: 2 c.c. or 30 minims.

Pelletierinae Tannas.—Pelletierine Tannate, U. S. P. Dosage: 0.25 gm. or 4 grains.

Pepsinum.—Pepsin, U. S. P. Dosage: 0.25 gm. or 4 grains.

Petrolatum.—Petrolatum, U. S. P.

Petrolatum Liquidum.—Liquid Petrolatum, U. S. P.

Phenol.—Phenol, U. S. P.

Phenol Liquefactum.—Liquefied Phenol, U. S. P. Dosage: 0.05 c.c. or 1 minim.

Phenolphthalein.—Phenolphthalein, N. N. R. Dosage: 0.05 to 0.5 gm. or 1 to 8 grains.

Phenylls Salicylas.—Phenyl Salicylate, U. S. P. Dosage: 0.2 to 0.5 gm. or 3 to 8 grains.

Phosphorus.—Phosphorus, U. S. P. Dosage: 0.5 mg. or 1/125 grain.

Physostigma.—Physostigma, U. S. P.

Physostigminae Salicylas.—Physostigmine Salicylate, U. S. P. Dosage: 1 mg. or 1/60 grain.

Physostigminae Sulphas.—Physostigmine Sulphate, U. S. P. Dosage: 1 mg. or 1/60 grain.

Pilocarpus.—Pilocarpus, U. S. P.

Pilocarpinae Hydrochloridum.—Pilocarpine Hydrochloride, U. S. P. Dosage: 0.001 to 0.01 gm. or 1/60 to 1/6 grain.

Pilocarpinae Nitras.—Pilocarpine Nitrate, U. S. P. Dosage: 0.01 gm. or 1/5 grain.

Pituitary Extract.—Pituitary Extract, N. N. R. (to be added). Dosage: 1 c.c. or 15 minims.

Pix Liquida.—Tar, U. S. P.

Unquentum Pleis Liquidae.—Tar Ointment, U. S. P.

Plumbi Acetas.—Lead Acetate, U. S. P. Dosage: 0.065 gm. or 1 grain.

Liquor Plumbi Subacetatis.—Solution of Lead Subacetate, U. S. P.

Podophyllum.—Podophyllum, U. S. P.

Resina Podophylli.—Resin of Podophyllum, U. S. P. Dosage: 0.003 to 0.006 gm. or 1/20 to 1/10 grain.

Potassii Acetas.—Potassium Acetate, U. S. P. Dosage: 2 gm. or 30 grains.

Potassii Bicarbonas.—Potassium Bicarbonate, U. S. P. Dosage: 2 gm. or 30 grains.

Potassii Bitartras.—Potassium Bitartrate, U. S. P. Dosage: 2 gm. or 30 grains.

Potassii Bromidum.—Potassium Bromide, U. S. P. Dosage: 1 gm. or 15 grains.

Potassii Carbonas.—Potassium Carbonate, U. S. P. Dosage: 1 gm. or 15 grains, well diluted.

Potassii Chloras.—Potassium Chlorate, U. S. P. Dosage: Saturated solution may be used as mouth wash or gargle.

Potassii Citras.—Potassium Citrate, U. S. P. Dosage: 1 gm. or 15 grains.

Potassii Citras Effervescentes.—Effervescent Potassium Citrate, U. S. P. Dosage: 4 gm. or 60 grains.

Potassii et Sodii Tartras.—Potassium and Sodium Tartrate, U. S. P. Dosage: 8 gm. or 120 grains.

Pulvis Effervescens Compositus.—Seidlitz Powder, U. S. P. Dosage: One set of two papers.

Potassii Hydroxidum.—Potassium Hydroxide, U. S. P.

Liquor Potassii Hydroxidi.—Solution of Potassium Hydroxide, U. S. P. Dosage: 1 c.c. or 15 minims.

Potassii Iodidum.—Potassium Iodide, U. S. P. Dosage: 0.3 to 2 gm. or 5 to 30 grains.

Potassii Permanganas.—Potassium Permanganate, U. S. P. Dosage: 0.03 to 0.06 gm. or 1/2 to 1 grain.

Protargol.—Protargol, N. N. R., Silver Proteinate. Dosage: 1.2,000 to 1 per cent. solutions.

Prunus Virginiana.—Wild Cherry, U. S. P.

Syrupus Pruni Virginianae.—Syrup of Wild Cherry, U. S. P. Dosage: 5 c.c. or 1 fluidram.

Quinina.—Quinine, U. S. P. Dosage: 0.25 gm. or 4 grains.

Quininae Bisulphas.—Quinine Bisulphate, U. S. P. Dosage: 0.25 gm. or 4 grains.

Quininae Hydrochloridum.—Quinine Hydrochloride, U. S. P. Dosage: 0.25 or 4 grains.

Quininae Sulphas.—Quinine Sulphate, U. S. P. Dosage: 0.25 gm. or 4 grains.

Quininae Tannas.—Quinine Tannate, N. N. R. Dosage: 0.5 gm. or 7½ grains.

Quininae et Ureae Hydrochloridum.—Quinine and Urea Hydrochloride, N. N. R. Dosage: 0.25 gm. or 4 grains.

Resina.—Resin, U. S. P. (to be deleted).

Resorcinol.—Resorcinol, U. S. P. Dosage: 0.125 gm. or 2 grains.

Rhamnus Purshiana.—Cascara Sagrada, U. S. P.

Fluidextractum Rhamni Purshianae.—Fluidextract of Cascara Sagrada, U. S. P. Dosage: 1 c.c. or 15 minims.

Fluidextractum Rhamni Purshianae Aromaticum.—Aromatic Fluidextract of Cascara Sagrada, U. S. P. Dosage: 0.6 to 2 c.c. or 10 to 30 minims.

Extractum Rhamni Purshianae.—Extract of Cascara Sagrada, U. S. P. Dosage: 0.1 to 0.5 gm. to 2 to 8 grains.

Rheum.—Rhubarb, U. S. P. Dosage: 1 gm. or 15 grains.

Extractum Rhei.—Extract of Rhubarb, U. S. P. Dosage: 0.25 gm. or 4 grains.

Tinctura Rhei Aromatica.—Aromatic Tincture of Rhubarb, U. S. P. Dosage: 2 c.c. or 30 minims.

Syrupus Rhei Aromaticus.—Aromatic Syrup of Rhubarb, U. S. P. Dosage: 8 c.c. or 2 fluidrams.

Ricini Oleum.—Castor Oil, U. S. P. Dosage: 15 c.c. or 4 fluidrams.

Rosa.—Rose

Oleum Rosae.—Oil of Rose, U. S. P.

Aqua Rosae.—Rose Water, U. S. P.

Saccharum.—Sugar, U. S. P.

Syrupus.—Syrup, U. S. P.

Saccharum Lactis.—Sugar of Milk, U. S. P.

Salvarsan.—Salvarsan, N. N. R. Dosage: 0.5 gm. or 7½ grains.

Neosalvarsan.—Dosage: 0.75 gm. or 12 grains.

Santal Oleum.—Oil of Santal, U. S. P. Dosage: 0.5 c.c. or 8 minims.

Santoninum.—Santonin, U. S. P. Dosage: 0.065 gm. or 1 grain.

Sapo.—Soap, U. S. P.

Linimentum Saponis.—Soap Liniment, U. S. P.

Sapo Mollis.—Soft Soap, U. S. P.

Sarsaparilla.—Sarsaparilla, U. S. P.

Syrupus Sarsaparillae Compositus.—Compound Syrup of Sarsaparilla, U. S. P. Dosage: 16 c.c. or 4 fluidrams.

Scilla.—Squill, U. S. P. Dosage: 0.125 gm. or 2 grains.

Tinctura Scillae.—Tincture of Squill, U. S. P. Dosage: 1 c.c. or 15 minims.

Syrupus Scillae.—Syrup of Squill, U. S. P. Dosage: 2 c.c. or 30 minims.

Scopolaminæ Hydrobromidum.—Scopolamine Hydrobromide, U. S. P. Dosage: 0.5 mg. or 1/125 grain.

- Senna.**—Senna, U. S. P. Dosage: 4 gm. or 60 grains.
Fluidextractum Sennae.—Fluidextract of Senna, U. S. P. Dosage: 2 c.c. or 30 minims.
Syrupus Sennae.—Syrup of Senna, U. S. P. Dosage: 4 c.c. or 1 fluidram.
- Serum Antidiphthericum.**—Antidiphtheric Serum, Diphtheria Antitoxin, U. S. P. Dosage: Immunizing, 500 to 1,000 units; curative, 10,000 units.
- Serum Antitetanicum.**—Antitetanic Serum, N. N. R. Dosage: Immunizing, 1,500 units; in tetanus, 3,000 to 20,000 units.
- Sinapis.**—Mustard.
Sinapis Nigra.—Black Mustard, U. S. P. Dosage: 8 gm. or 120 grains.
Charta Sinapis.—Mustard Paper, U. S. P.
Oleum Sinapis Volatile.—Volatile Oil of Mustard, U. S. P. Dosage: 0.008 c.c. or $\frac{1}{2}$ minim.
- Sodii Arsanias.**—Sodium Arsanilate, N. N. R. Dosage: 0.02 gm. or $\frac{1}{3}$ grain.
- Sodii Arsenas.**—Sodium Arsenate, U. S. P. Dosage: 5 mg. or $\frac{1}{10}$ grain.
- Sodii Benzoas.**—Sodium Benzoate, U. S. P. Dosage: 1 gm. or 15 grains.
- Sodii Bicarbons.**—Sodium Bicarbonate, U. S. P. Dosage: 1 gm. or 15 grains.
- Sodii Biphosphas.**—Sodium Acid Phosphate, N. N. R. (to be added). Dosage: 1 to 1.5 gm. or 15 to 20 grains.
- Sodii Boras.**—Sodium Borate, U. S. P. Dosage: 0.5 gm. or $7\frac{1}{2}$ grains.
- Sodii Bromidum.**—Sodium Bromide, U. S. P. Dosage: 1 gm. or 15 grains.
- Sodii Cacodylas.**—Sodium Cacodylate, N. N. R. Dosage: 0.03 gm. or $\frac{1}{2}$ grain.
- Sodii Carbonas Monohydratus.**—Monohydrated Sodium Carbonate, U. S. P. Dosage: 0.25 gm. or 4 grains.
- Sodii Chloridum.**—Sodium Chloride, U. S. P. Dosage: 16 gm. or 240 grains, emetic; 4 gm. or 60 grains, laxative.
- Sodii Hydroxidum.**—Sodium Hydroxide, U. S. P.
Liquor Sodii Hydroxidi.—Solution of Sodium Hydroxide, U. S. P. Dosage: 1 c.c. or 15 minims.
- Sodii Iodidum.**—Sodium Iodide, U. S. P. Dosage: 0.5 gm. or $7\frac{1}{2}$ grains.
- Sodii Nitris.**—Sodium Nitrite, U. S. P. Dosage: 0.065 or 1 grain.
- Sodii Phosphas.**—Sodium Phosphate, U. S. P. Dosage: 2 gm. or 30 grains.
- Sodii Phosphas Effervescons.**—Effervescent Sodium Phosphate, U. S. P. Dosage: 8 gm. or 120 grains.
- Sodii Salicylas.**—Sodium Salicylate, U. S. P. Dosage: 1 gm. or 15 grains.
- Sodii Sulphas.**—Sodium Sulphate, U. S. P. Dosage: 16 gm. or 240 grains.
- Sodii Sulphis.**—Sodium Sulphite, U. S. P. Dosage: Applications of 1 in 10 or 1 dram to the ounce.
- Sodii Thiosulphas.**—Sodium Thiosulphate, U. S. P. Dosage: 1 gm. or 15 grains.
- Sparteinae Sulphas.**—Sparteine Sulphate, U. S. P. (to be deleted). Dosage: 0.01 gm. or $\frac{1}{5}$ grain.
- Staphylococcus Vaccine.**—See Vaccine, Staphylococcus.
- Stramonium.**—Stramonium, U. S. P.
- Strophanthinum.**—Strophanthin, U. S. P. Dosage: 0.0003 gm. or $\frac{1}{200}$ grain.
- Strophanthus.**—Strophanthus, U. S. P.
Tinctura Strophanthi.—Tincture of Strophanthus, U. S. P. Dosage: 0.5 c.c. or 8 minims.
- Strychnina.**—Strychnine, U. S. P. Dosage: 0.0005 to 0.005 or $\frac{1}{100}$ to $\frac{1}{10}$ grain.
- Strychninae Nitrates.**—Strychnine Nitrate, U. S. P. Dosage: 0.001 gm. or $\frac{1}{60}$ grain.
- Strychninae Sulphas.**—Strychnine Sulphate, U. S. P. Dosage: 0.031 gm. or $\frac{1}{60}$ grain.

Sulphonal.—See under Sulphonmethanum.

Sulphonethylmethanum.—Sulphonethylmethane, U. S. P. — Trional.
Dosage: 1 gm. or 15 grains.

Sulphonmethanum.—Sulphonmethane, U. S. P.—Sulphonal. Dosage: 1 gm. or 15 grains.

Sulphur.—Sulphur.

Sulphur Lotum.—Washed Sulphur, U. S. P. Dosage: 4 gm. or 60 grains.

Sulphur Præcipitatum.—Precipitated Sulphur, U. S. P. Dosage: 4 gm. or 60 grains.

Sulphur Sublimatum.—Sublimed Sulphur, U. S. P. Dosage: 4 gm. or 60 grains.

Unguentum Sulphuris.—Sulphur Ointment, U. S. P.

L-Suprarenin Synthetice.—See Epinephrine.

Tannalbin.—See under Acidum Tannicum.

Terebinthina.—Turpentine, U. S. P.

Oleum Terebinthinæ.—Oil of Turpentine, U. S. P. Dosage: 1 c.c. or 15 minims.

Terpini Hydras.—Terpin Hydrate, U. S. P. Dosage: 0.125 gm. or 2 grains.

Tetanus Antitoxin.—See under Serum Antitetanicum.

Theobromatis Oleum.—Oil of Theobroma, U. S. P.

Theobromina.—Theobromine, N. N. R. Dosage: 0.3 gm. or 5 grains.

Theobrominae Sodii-Salicylas.—Theobromine Sodium Salicylate, N. N. R.—Diuretin. Dosage: 0.5 gm. or 7½ grains.

Thymol.—Thymol, U. S. P. Dosage: 0.1 gm. or 2 grains.

Thymolis Iodidum.—Thymol Iodide, U. S. P.

Typhoid Vaccine.—See Vaccine, Typhoid.

Tiglii Oleum.—Croton Oil, U. S. P. Dosage: 0.05 c.c. or 1 minim.

Tragacantha.—Tragacanth, U. S. P.

Trional.—See under Sulphonethylmethanum.

Tuberculinum.—Tuberculin, N. N. R.

Urotropin.—See Hexamethylenamina.

Vaccine, Staphylococcus.—Staphylococcus Vaccine, N. N. R. (to be added). Dosage: 1,000,000,000 bacteria.

Vaccine, Typhoid.—Typhoid Vaccine, N. N. R. (to be added). Dosage: 500,000,000 to 1,000,000,000 bacteria.

Vaccine Virus.—See under Virus, Vaccine.

Valeriana.—Valerian, U. S. P.

Tinctura Valerianæ Ammoniata.—Ammoniated Tincture of Valerian, U. S. P. Dosage: 2 c.c. or 30 minims.

Veronal.—N. N. R. Dosage: 0.3 to 0.6 gm. or 5 to 10 grains.

Sodii Diæthyl-Barbituras.—Sodium Diethyl-Barbiturate, N. N. R. Dosage: 0.3 to 0.6 gm. or 5 to 10 grains.

Viburnum Prunifolium.—Viburnum Prunifolium, U. S. P. (to be deleted).
Fluidextractum Viburni Prunifolii.—Fluidextract of Viburnum Prunifolium, U. S. P. (to be deleted). Dosage: 2 c.c. or 30 minims.

Virus Vaccinum.—Vaccine Virus, N. N. R.

Zinci Acetas.—Zinc Acetate, U. S. P. Dosage: 0.125 gm. or 2 grains.

Zinci Chloridum.—Zinc Chloride, U. S. P.

Liquor Zinci Chloridi.—Solution of Zinc Chloride, U. S. P.

Zinci Oxidum.—Zinc Oxide, U. S. P. Dosage: 0.25 gm. or 4 grains.

Unguentum Zinci Oxidi.—Ointment of Zinc Oxide.

Zinci Stearas.—Zinc Stearate, U. S. P.

Zinci Sulphas.—Zinc Sulphate, U. S. P. Dosage: 2 gm. or 30 grains.

Zingiber.—Ginger, U. S. P. Dosage: 1 gm. or 15 grains.

Tinctura Zingiberis.—Tincture of Ginger, U. S. P. Dosage: 2 c.c. or 30 minims.

GENERAL INFECTIOUS DISEASES

INDIVIDUAL TENDENCIES

Teachers of therapeutics emphasize the necessity of individualizing the patient, but even they sometimes forget the importance of family tendencies. There is no more doubt that an individual inherits family weakness and family strength, or, if the phrase is preferred, family tendencies, than there is that he inherits the features and general physique of his parents and grandparents.

While it may be going a step backward to speak of temperaments, we certainly should consider, as pointed out by Duckworth, the tendencies of the individual. These tendencies are often recognizable by the general appearance and physical findings but if not can almost always be developed by a careful investigation into the family history of the patient.

THE FAMILY HISTORY

It should be the rule of the physician to inquire into the family history as carefully with every new patient as is required in an insurance examination.

Heredity and environment are the two factors that are most prominent in the production of physical and mental health. Environment may improve or mar heredity, but cannot change it. Heredity is therefore the most important factor in raising and developing an ideal race. The importance of good environment for the perpetuation of physical and mental health is so well understood that it requires no discussion. But environment will not eliminate a hereditary tendency to disease or to mental or physical insufficiency. Neither will environment develop perfect mental and physical health when there is an inherited deficiency, although environment can markedly improve deficiency caused by injury or acquired by disease.

The environment of prospective fathers and mothers and their future children is being constantly improved by the public health advances now being

made in all communities, but as has been stated, this will not prevent the ravages of inherited disease (syphilis, epilepsy, insanity, imbecility, physical weakness) or of the inherited tendency to disease (tuberculosis, cancer, gout, diabetes, alcoholism, etc.), any more than environment can produce twins, beauty, geniuses or permanent health. In fact, improved environment is doing more for the defectives in all lines than for those of good heredity, who would survive a less improved environment.

It, therefore, is of vital importance to the patient that his physician should know and recognize the diathesis or predisposition to certain types of disease that he has inherited, so that whatever treatment his present condition may call for, the tendency to the family weakness may be at the same time properly combated.

UNSCIENTIFIC PRESCRIBING

Lack of scientific therapeutic teaching causes a large number of general practitioners to listen to enthusiastic proprietary detail men and subsequently to use a preparation for a given condition the active ingredient of which the teacher of medicine may have long used, but in a simpler and less expensive manner. The physician using such a preparation and obtaining good results frequently rushes into print and lauds the preparation or combination of drugs as a cure for that condition or disease, when really it is the principal active ingredient of it that did the work, and which perhaps had been used for that purpose for years.

The thing needed, then, in scientific therapeutics is more careful instruction in details by the teachers and bedside clinicians, and, as pointed out by Gottheil, a willingness on the part of the general practitioner to describe his failures as well as his successes. Also the general practitioner who writes of his therapeutic successes should constantly bear in mind, first, the trend of troublesome conditions to recovery; second, that it is not always the last drug, preparation or treatment that benefited the patient, but that the previous treatment really caused the cure; third, that many a new drug or new preparation offered with the enthusiasm

of the physician cures a patient by psychic effect, much as often does a change of physicians or a change of environment.

THERAPEUTICS MORE THAN MEDICINE

A disease can not be correctly treated unless the following facts are considered:

1. Can the etiologic factor in a given disease be discovered, and can it be removed? This is the primary treatment.

2. What physiologic processes in this patient are disturbed by this disease? The aim of all treatment should be the attempt to correct such disturbed physiology, and at the same time not to disturb the normal physiologic processes.

3. The pathologic conditions which are the result of the disease should be removed, if possible; ameliorated if removal is not possible; and never irritated or made worse by any medicinal or physical treatment. Special care should be taken that whatever treatment is deemed advisable for the patient, it should not aggravate or make worse the pathologic condition present.

4. The symptoms and signs of the disease which in their totality determine the diagnosis, and the extent to which the pathology of the disease has progressed, are in their totality of minor and secondary importance in the treatment. On the other hand, individual troublesome symptoms must be removed or ameliorated, else normal physiologic processes which are necessary to recovery can not be performed, and toxemias that otherwise need not have occurred may perhaps be the determining cause of the non-recovery of the patient.

PAIN AS A SYMPTOM

Of all symptoms, that of pain is the most important and the one from which the patient must have relief. It does not seem to make a great deal of difference whether such pain is pathologically excusable or present only on account of psychologic mistake, the nervous irritability and finally depression caused by it must be taken into consideration and must be treated or, better, managed. At least, pain must be prevented at any cost. This does not mean that the physician should

hasten to the use of unneeded narcotics, nor that he should ever use a narcotic without regret and without the extra supervision that should always go with such treatment, but it is the skillful, thoughtful, discriminating physician who can determine the best method of eradicating the symptom of pain in each individual patient. We should remember that is frequently possible, in making examinations or in treating patients, to secure for him great comfort merely by altering the posture. Pain after operation is frequently due to lack of support of the back. Incidentally the soothing effects of the warm bath or the warm pack should not be overlooked. The use of olive oil in gastro-intestinal pain is worthy of consideration. It is commonly possible by the use of such means to relieve pain without the employment of any narcotic.

MEASLES

THE PROPHYLAXIS OF MEASLES

Measles is a disease to which practically every individual who has not already suffered an attack is susceptible. It is one of the most contagious of all diseases, ranking in this respect with smallpox and typhus fever.

It seems almost invariably true that one attack of the disease protects against subsequent attacks, though most writers teach that a second, third, and even fourth attack are not uncommon. It is probable that when these repeated attacks are alleged to have occurred, some of them at least were other cutaneous infectious diseases, especially so-called German measles, or some eruptive but non-contagious disease.

It has been observed that children under six months of age are less likely to take this disease than older children, and that extremely old people are also less susceptible. Also, it seems to be a fact that the disease is most disastrous in its effects on infants, on children who have scrofulous glands, on persons who are tuberculous, or who have any tendency to tuberculosis, on individuals who are debilitated from any cause, and on women who are pregnant or who have recently been confined.

The above being true, effort should be made to isolate children who are suffering from measles in order to prevent the spread of the disease, at least to people in whom an attack of the disease is likely to be followed by disastrous results.

The contagious element of measles appears to have less vitality and to resist the ordinary measures of disinfection, including sunlight and fresh air, much less strongly than does the contagium of scarlet fever. It seems to exist extensively in the secretions from the nose, throat and mouth, and the disease seems to be especially contagious during the period when the catarrhal symptoms are manifest, but before the cutaneous eruption appears. This increases the difficulty of enforcing efficient quarantine. When the disease is prevalent, children who show symptoms of cold in the head should be suspected of perhaps having measles and should be promptly quarantined, but at the beginning of an epidemic it is rare that a child will be placed in quarantine before the eruption has appeared.

When the rule is extended so as to apply to these patients, both whooping-cough and measles will be less rapidly passed around among the children.

The measures enumerated as applicable to scarlet fever and which are also applicable to cases of measles may be briefly summarized as follows:

The isolation of the patient in a remote room of the house.

The selection of a single immune person to care for the patient.

The wearing by the physician of a linen or rubber coat, when he visits the patient, which is removed outside of the patient's door.

The destruction of books and toys, which have been used by the patient, at the end of the period of quarantine.

The disinfection of dishes and clothing before they are removed from the sickroom.

At the end of the period of quarantine, which in the case of measles unattended by complications should be three weeks, the bathing and shampooing of the patient, and dressing him in fresh clothes.

The disinfection of the room, after it has been vacated, by exposure of the room so far as possible to fresh air and sunshine.

Sunshine and light are essential to the killing of the germs of all disease, and especially of measles; hence the room of a patient suffering from measles *should only rarely be kept dark during the day*. The patient's eyes may be efficiently protected from light by blue or smoked glasses.

The prolonged cough of measles after the period of quarantine is over should be treated as though the patient had incipient tuberculosis, and then the number of secondary deaths from measles will be cut in half.

TREATMENT

A patient with measles must be isolated. The room must be warm, as these patients should not be subjected to cold drafts or cold air. Chilling is especially harmful in measles. This does not mean that the air of the room should not be fresh and clean, and the ventilation the best possible.

Eyes.—Unless the child is very young and cannot wear colored spectacles, the room should not be dark. Sunlight is as essential for the welfare of patients with measles as it is in any other disease. It is absolutely unnecessary, in ordinary cases, to have the room black dark on account of the eyes. If the eyes are inflamed, the child will cooperate and really enjoy using colored spectacles. Of course, when it is time for the child to go to sleep, the room may be darkened, and the glasses removed.

A saturated boric acid solution may be used as a wash for the eyes, and if it seems advisable, some simple eye-drops may be used, such as:

| | Gm. or c.c. | |
|----------------------|-------------|-------|
| R Acidī borici..... | 25 | gr. v |
| Aquae camphorae..... | 15 | ℥ss |
| Aquae .....q.s. ad | 25 | ℥i |

M. Sig.: Use as eye-drops three or four times a day.

If the lids tend to stick together after sleeping, they should be gently washed with warm boric acid solution or plain warm water, and before the child

goes to sleep the edges of the lids may be anointed with thick white petrolatum.

Cough, Etc.—If old enough, the child should gargle several times a day with some simple, warm, alkaline sedative solution. If the child is not old enough to gargle, the throat should be sprayed. The nose should also be sprayed occasionally, if it seems stopped up. However, it is often well to leave the nose alone in measles. Most nasal douching is inadvisable, as tending to force fluid or secretions into the eustachian tubes.

Most of these patients require some simple expectorant mixture, although many physicians are losing faith in the activity of so-called expectorant drugs. There is no safe drug that promotes the secretion of the mucous membrane of the upper air passages and bronchial tubes more than does ammonium chlorid. It is of advantage in causing the cough to be less dry, and therefore aiding the expulsion of any mucopurulent matter that may be in the trachea and bronchial tubes. Also, if the cough is excessive from irritation, a sedative should be added to prevent the unnecessary coughing. A child 5 years old may receive the following:

| | Gm. or c.c. | |
|---------------------------|-------------|--------|
| ℞ Codeinae sulphatis..... | 05 | gr. i |
| Ammonii chloridi..... | 3 | ʒ i |
| Syrupi tolutani..... | 50 | flʒ ii |
| Aquae .....q.s. ad | 100 | flʒ iv |

M. Sig.; A teaspoonful, in water, every two or three hours, when the child is awake.

If the child's cough is not excessive or irritating, the codein may be omitted from the mixture. As soon as the expectoration is more free and there is no excessive amount of coughing, the medicine may be stopped. A child 10 years old should receive twice the amount of codein sulphate, and the ammonium chlorid should be increased to 5 gm., and if deemed advisable, the sour sirup of citric acid may be substituted for the sweet sirup of tolu in amount of 25 c.c. to the 100 c.c. mixture.

Bowels.—In the beginning of the disease, the child should receive a small dose of calomel, 0.05 or 0.10 gm. (1 to 1½ grains) given with milk; or a dose

of castor oil, or some rhubarb or cascara; at least, the bowels should be thoroughly and well moved. Minute doses of calomel frequently repeated should not be given, as such dosage causes irritation and no benefit. Subsequently the bowels should be moved daily with some gentle laxative, if such is needed.

Diet.—The food depends on the temperature, and should be liquid and simple as long as the temperature is elevated. As soon as the temperature falls to normal, the child should receive good nutritious food, and plenty of it. It is inadvisable to give meat in any form, including broths, as long as the eruption is present. If, as has been suggested, the eruption in measles is caused by some irritant circulating in the blood, such as occurs in urticaria, representing a sort of anaphylaxis, the proper diet comprises cereals, milk, and plenty of water. Such little patients are better without fruits, as sometimes even orangeade or lemonade seems to cause more itching and discomfort of the skin.

Fever.—The temperature rarely calls for much treatment. If it is high, however, one or two doses of acetanilid will generally be sufficient to reduce it. Hot sponging will cool the child as much as cold sponging will, and with less disturbance. Cold sponging in measles is inadvisable. As often as the child is bathed or sponged for temperature, the surface of the body should be powdered with some bland talcum.

Skin.—Unless the room is cold and damp, or the patient is otherwise ill, a cotton nightdress will cause less itching and discomfort than would a warmer flannel or silk shirt. All through the illness the nurse should recognize that it is the secretions of the nose and throat that cause infection of others, and not the eruption or exfoliation from the skin. This does not mean that it is not necessary to sterilize the child's garments and bedclothing, as such may carry the infection from the nose and throat.

Convalescence.—Prolonged, careful convalescence is essential in measles. Measles, like whooping cough, is often a forerunner of pulmonary tuberculosis. Probably no attack of measles ever occurs that does not cause enlargement and more or less inflammation

of the bronchial glands. If such glands harbor tubercle bacilli, they are stimulated to cause an acute infection. On the other hand, immediately after an attack of measles a patient is doubtless more susceptible to infection from tubercle bacilli. Therefore, before the child is returned to school the cough should have ceased, his weight should be normal, and his nutrition should be good.

Persistent enlarged glands in the neck or elsewhere, and adenoid conditions or enlarged tonsils, should all be regarded with suspicion. Such conditions are liable to be accentuated by an attack of measles, and proper treatment should be instituted. A suppurating ear must be treated by a specialist until pronounced cured and the hearing is as near perfect as possible. The physician should remember that most defective ears follow measles, scarlet fever and influenza; that an acutely infected ear, if immediately correctly treated, is generally saved intact; distention and perforation may occur without pain. Consequently, he should be ever alert to see that the complication of middle-ear inflammation is immediately treated.

SCARLET FEVER

PROPHYLAXIS OF SCARLET FEVER

Every physician, no matter how limited or specialized he may attempt to make his practice, is likely to encounter a case of scarlet fever, and to have his opinion asked in regard to what should be done to prevent the transmission of the disease to others. He should be able to state promptly, clearly, concisely and positively what should be done by the family in which the disease occurs to prevent its spread to other individuals, what the family which does not have it, but is afraid of getting it, should themselves do, as well as what they have a right to expect others to do, in order to prevent the spread of the disease.

To the development of sanitary science and preventive medicine we are indebted for the recognition of the fact that scarlatina, scarlet rash and scarlet fever are synonymous terms. While scarlet fever may be, and often is, a very serious disease with high temperature, severe sore throat, intense and widely spread

eruption, followed by copious desquamation, the fever may be slight or entirely absent, the throat may not show more than slight congestion, the eruption, if not entirely absent, may be not very pronounced in appearance, not widely spread over the body and of rather transient duration, while the desquamation may be so slight as to be hardly recognizable.

Furthermore, it is now generally recognized not only that the very mild cases may be followed by the most serious sequelæ which are observed after the severe forms of the disease, and particularly by inflammation of the kidneys, but also that severe forms of scarlet fever may be, and often are, contracted from patients whose symptoms have been exceedingly mild.

A possible explanation of apparent immunity to scarlet fever may be, at least in some cases, that these immune individuals have in their earlier life passed through an attack of scarlet fever of so mild a type that no physician was called to the patient, or if one was called, he did not recognize the nature of the disease. This, however, probably does not explain all cases of apparent immunity. Undoubtedly there are many persons who never contract the disease except after unusual exposure. On the other hand, it is unjustifiable carelessly or wittingly to expose child or adult to the disease, no matter how mild the type may be.

CONTAGIOUSNESS

It was long believed that the contagious element of the disease existed in the scales which occur in greater or less profusion during desquamation. At present there is a tendency to believe that the scales in themselves do not possess the power of transmitting the disease. On the other hand, it has not been finally proved that the scales are innocuous. Consequently, the importance of controlling the dissemination of these scales is an open question.

The belief has been gaining ground that the element of contagion exists actively and abundantly in the secretions from the throat and nose, and also in the discharges from the ear and from the suppurating glands when they are present. Also it is believed that when the disease is transmitted by dissemination of the

scales, it is due to the fact that the latter have been contaminated by these secretions. Obviously then, the problem which confronts both family and physician, as well as sanitarian, is to control the dissemination of these various secretions, discharges, exfoliations, and the usual secretions.

ISOLATION AND DISINFECTION

The mastery of the problem embraces first, isolation; second, disinfection.

The establishment of isolation often taxes severely the tact and good judgment of the physician. If the family is large and lives in a small house or apartment and on a limited income, and if the municipality possesses an isolation hospital, or wards of a hospital are set apart for the treatment of contagious diseases, the easiest way is to transport the patient immediately to such an institution. Here he will be under the care of attendants who are accustomed to handling patients with the disease, and who are trained to exercise all the precautions necessary to prevent the spread of the disease. Most towns have no special provision for taking care of scarlet fever, and in such cases the patients must be treated in their own homes. If the family has ample means and lives in a large house, a large room or a suite of rooms must be set apart for the exclusive use of the patient and the special attendant, who must be secured to give him exclusive attention. Such an apartment or suite should, if possible, be selected on the third floor of the house or at the end of a hall, so that the other members of the family will have no occasion to go near it. The room should be large and sunny, and all unnecessary articles, such as curtains, upholstered furniture, and ornaments, should be removed, so that there will be as few articles as possible to which the disease poison may adhere and which will need to be cleaned or destroyed after the recovery of the patient. The attendant should not invade other parts of the house. Food and other necessities should be left outside the door of the apartment occupied by the patient by another member of the household. Similarly, everything which requires removal from the infected apartment should be disinfected and placed outside the apartment, and thence

carried away. The most important things which are likely to require removal are dishes, clothing, and excreta. These should be disinfected by being placed in suitable vessels and then allowed to soak for an hour in a 2.5 per cent. solution of phenol (carbolic acid). Things which are of little or no value and which are combustible, such as the remnants of food and pieces of cloth or paper which have been used about the room, should be burned. If the nurse finds it necessary to leave the patient's quarters, she should change all her outer garments outside of the patient's room, she should cover her hair, and avoid coming into close contact with anyone. These precautions of isolation should be carried out continuously and strictly until desquamation is entirely completed. During the period of desquamation the patient should be sponged or bathed once or twice a day with hot water (and if there are bath-room facilities the convalescent should have a daily hot tub bath), and then the skin should be anointed with adeps lanæ hydrosus (lanolin) which has been softened with almond (or other bland) oil, and perfumed to suit. Phenol (carbolic acid) ointments are inadvisable, as any absorption would irritate the kidneys. Sponging with alcohol is contra-indicated. After desquamation has ceased, the patient should remove all the clothing which he has been wearing, take a warm bath, with soap, and have his head well shampooed. Then he must dress himself throughout in fresh clothing.

The apartment should be thoroughly disinfected.

Fumigation after scarlet fever, diphtheria and measles does not seem to pay for the cost and trouble it causes, and should be abolished. Proper fumigation with strong formaldehyd, carried out by boards of health, should still be done for smallpox and tuberculosis, and perhaps for erysipelas, childbed fever and tetanus, especially in hospitals. Spraying with germicides of all the immediate surroundings of an infected patient is the method of disinfection now most satisfactory. All washable clothing and bedclothing should be boiled: all other clothing should be baked and put into the sunlight. Carpets and rugs should be washed with antiseptics. Various washing solutions may be used, such as chlorinated lime solutions, 5 per cent.,

formaldehyd solutions, corrosive sublimate solutions 1:500, 5 per cent. phenol (carbolic acid) solutions, or better, the higher coal-tar disinfectants, as liquor cresolis compositus. The New York Board of Health orders the woodwork and floors scrubbed with hot solution of 1 pound of washing soda to 3 gallons of hot water. Bedding and night clothing are ordered soaked in phenol solutions and then boiled in soapsuds for half an hour. Books and toys should be burned. It should never be forgotten that outside air and sunlight are among the most useful of disinfectants.

When it is possible to carry out such strict isolation as has been described, there is no necessity of quarantining the rest of the family, but, unfortunately, such complete isolation is ideal, and can rarely be carried out in actual practice. Even when a large family occupies a few rooms, it is essential that one room be selected for the patient, and that he be kept in it constantly, and that the other members of the family be kept out of it entirely, except one who is selected to act as the attendant, usually the mother. Under such conditions it is usually entirely impracticable for the attendant to remain constantly in the room with the patient. She must frequently leave the room, not only to get things which the patient requires, but also to perform services for the remainder of the family. Under these circumstances it is desirable and often entirely practicable that such members of the family as attend school, or work in stores or shops should leave home, and should live elsewhere for six or eight weeks. Those who are obliged to remain at home should avoid as much as possible coming into contact with the attendant. The latter should have several aprons, with sleeves, and large enough to cover all her outer clothing. One of these she should wear constantly while in the patient's room. Needless to state, she should always wash her hands on leaving the room.

It is generally believed by the medical profession that physicians who use even a moderate degree of caution rarely transport the disease from a patient to another individual, and when this does happen, the victim is usually a member of his own family. He should endeavor so to arrange his calls that he will not
o directly from a patient ill with scarlet fever to a

family in which there is a child. On entering the room of such a patient he should put on a long cotton, linen or rubber coat. He should avoid sitting on the bed, or allowing the bed-clothing to come in contact with his own clothing. On leaving the room he should thoroughly wash his hands and dry them on a clean towel and remove the gown just outside the patient's door.

During the convalescence the patient should not be allowed to use books from the public library or the public school, and should use only such books, magazines and newspapers as can be burned when he is through with them, or when the period of isolation is ended. Neither should he be allowed to write and send letters through the mail or by messenger to his friends.

Although many practitioners have been in the habit of prescribing medicine designed, so they claimed, to prevent persons exposed to the disease from contracting it or developing it, candor compels the statement that no drug or any treatment is known which will accomplish this result. Although belladonna has been extensively used for this purpose, and has been believed by many to have accomplished the prevention of the disease, there is no adequate reason for believing that it has ever produced this result.

Although often advocated, and sometimes used, the impregnation of the atmosphere of the room with antiseptics (phenol) and aromatic oils seems to be of no value in killing the germs or in hastening recovery. Various cresol preparations are recommended for this purpose, but their value is small, and the danger of too much absorption of phenol vapor causing kidney irritation is ever present. The fraudulent assertion that ozone-producing apparatus prevents the growth and dissemination of scarlet fever germs is little less than criminal.

Dogs and cats must be excluded from all patients suffering with contagious diseases, and this is especially true of scarlet fever. The doors and windows must be screened from flies, if it is the season for them.

TREATMENT

A. Isolation.—Strict isolation measures, already discussed under other headings, are most important in

this disease, and the nurse should distinctly understand that it is the secretions of the mouth and nose, and perhaps suppurating complications, that carry infection. The greatest possible care to disinfect or sterilize articles contaminated by such secretions should be exercised, as the infecting germ is persistent and lives for a long time unless killed. The most efficient cleanliness of the patient, nurse, and the physician who handles the case is also essential.

B. Diet.—As in the beginning of all diseases, especially the infectious diseases, the bowels should be thoroughly evacuated with castor-oil, calomel, or whatever the physician deems best; subsequently, they should be moved daily by some gentle laxative, found efficient. If the patient has diarrhea, it is generally caused by a mistake in the diet. Milk is the best basis for the diet in scarlet fever. Intestinal indigestion is not frequent. Foods that add products to the blood that during excretion are likely to cause irritation of inflamed kidneys should be avoided. The aim of the physician should be to diminish the inflammation and irritation of the skin, to keep it warm, to attempt to keep it moist and promote its secretion, and to give a diet rather low in proteins and without meat, meat extractives or purins. Also, if possible, no drugs should be administered that tend to irritate the kidneys, especially after the first week of the illness. Such drugs are coal-tar products, synthetic products, caffains, and any of the drugs that are known as stimulant diuretics. Even drugs that contain salicylic acid should be avoided.

The greater the intensity of the disease, the more liquid the diet should be. While milk is the basis, thin cereal gruels are advisable from the start. Malted milk may be added to this diet, and lemonade or orangeade or oranges, as deemed advisable. Later, toasted bread, crackers, and various kinds of cereals, and still later, baked potato, rice, corn starch, and many other cereal and milk foods, as well as a greater variety of fruit, should constitute the diet.

As soon as the convalescence is established, and even before, if the disease is prolonged, a small dose of iron should be given daily, as on the above diet

the blood cannot get this nutriment. A sugar of iron (saccharated oxid of iron) 3-grain tablet should be given from one to three times a day. Sodium chlorid should always be given a patient from the beginning, once or twice a day, in one or more of the feedings. If there is a tendency of the nose and throat to bleed, or there are hemorrhages in any other part of the body, lime-water should be added to the diet. The patient should always receive plenty of water. If any apparent irritation of the kidneys occurs, it may be well to withhold some of the fruits and to temporarily diminish the amount of food.

C. Fever.—If the temperature becomes very high it may be advisable to give several doses of an antipyretic, such as acetanilid, antipyrin, or acetphenetidin, always bearing in mind the irritant effect of these drugs on the kidneys. Hot sponging of the body will also tend to reduce the temperature and make the patient comfortable. It relieves itching, and many times is soothing. Cold sponging in scarlet fever is inadvisable and uncalled for. If the fever is excessive, tepid sponging may be tried. Restlessness and sleeplessness will also increase the fever, and often a few doses of sodium bromid will be of great benefit. It not only causes the patient to sleep, but reduces the irritability of the peripheral nerves. Also, anything that relieves itching or burning of the skin will reduce the temperature and the irritability. Quinin is inadvisable, as it is excitant to the brain and may tend to congest the ears and add one more element that may cause middle-ear complications. An ice cap to the head, unless actual meningitis is present and the hair is clipped close to the scalp, is inadvisable. Whether ice caps to the head ever reduce general temperature is open to grave doubt. If there is meningitis, they may relieve the local congestion. We doubt if they are ever of much value in general high temperature. In this form of treatment the ice cap should be applied whenever the patient is sponged with cold water. Ice caps, however, tend to fall to one side or the other of the head and unnecessarily chill the ears, and may become another factor in causing middle-ear inflammation. The value of an ice

bag over the mastoid when it is in danger is not under discussion; but an ice cap over an external ear is not called for, and may do harm.

D. Care of the Nose.—Antiseptic, alkaline and cleansing gargles and sprays for the throat and nose should be freely used and the value of boric acid should not be overlooked. The cleaner the nose and throat in scarlet fever, the less the secondary infection, the less the toxemia, and the less the danger. Whatever method is used to clean the nostrils, such pressure of the liquid as would tend to force infection into one or the other of the sinuses must never occur. If there is a purulent discharge from the nostrils, it is inadvisable to spray or douche them, as much harm can be done from too strenuous or unnecessary treatment of the nose.

E. Skin.—Whatever the temperature, hot sponging for cleanliness once or twice a day is of advantage, is soothing and advisable. Whatever the temperature, sponging with alcohol in any form is inadvisable. Alcohol, unless the solution is so dilute as to represent not alcohol, but only an alcoholic odor, will tend to dry the skin, cause more itching, and more discomfort. Sometimes sponging with bicarbonate of soda in warm water soothes the irritability and stops the itching. Powdering with some soothing talcum powder often stops itching and quiets the patient.

As soon as the acute eruption is over and desquamation is about to begin, the gentle rubbing into the skin of some bland oil, as cocoanut oil or almond oil or wool-fat, sometimes with little glycerin and water, hastens the removal of the dried epithelium, prevents scales from flying about (although these scales do not carry the contagium) and is very quieting to the patient, by preventing the irritation and itching. As soon as convalescence is established, a more active massage of the skin and muscles is advisable.

The use of mercuric chlorid or phenol solutions of any strength, or phenol ointments, on the skin, is inadvisable and inexcusable. Most of these solutions tend to dry the skin still more; the use of phenol ointment might result in some absorption and therefore is of danger to the kidneys. Also, as it seems to

be a fact that the contagium is not spread by the skin, there is absolutely no excuse for germicidal ointments or applications.

Unless the temperature is very high and head symptoms are present, it is unnecessary to cut the hair close to the scalp. If the scalp itches, as it often does, some simple sedative solution may be used. Later, a simple gentle shampoo may be given and a little petrolatum rubbed into the scalp. A tar soap may stop the itching. Oil of eucalyptus has been recommended and used as a non-irritant application to the skin and scalp. Also, throats have been swabbed with oil of eucalyptus preparations, in the belief that eucalyptus oil is especially antiseptic in throat contagions.

F. The Heart.—Cardiac stimulation, especially in children, is rarely needed in this disease. The toxin of this disease is not as depressant as is that of diphtheria, and strychnin is generally inadvisable as it causes too much cerebral stimulation, especially in children.

If a long septic process follows scarlet fever, or there is later a septicemia, small doses of strychnin may be of value, and alcohol is of value as not only adding a food, but as tending to prevent a dangerous acidemia. Also, in such septic conditions, as much carbohydrates should be given as the patient can digest.

If joint complications occur, there is more likely to be an endocarditis, and perhaps chorea may develop.

G. Late Complications.—*Middle-ear inflammations* should be expected and watched for. The drums should be early punctured if there is pressure, and the services of an expert on diseases of the nose, throat and ears should be early sought by the physician, if any of these complications occur.

The *glands* of the neck are almost always congested and enlarged in scarlet fever, and one or more may tend to suppurate. It often seems that the local application of a proper-sized ice bag to a gland, if the patient will tolerate such an application, aborts serious inflammation. However, if such a suspicious gland continues to enlarge, the temperature rises and blood counts show an increasing leukocytosis, there is prob-

ably pus formation, and the abscess should be soon opened. The surgeon, however, often decides that he prefers to have warm applications for a short time to cause more rapid breaking down of the central suppurating portion of the gland, so that more complete evacuation may occur on incision. The subsequent dressings and treatment of such an abscess are purely surgical. The temperature will generally drop after the evacuation of the pus, unless there is some other localized septic process.

Although the percentage of occurrence of *nephritis* in or following scarlet fever is not great, it occurs sufficiently often to be always looked for and expected. As above urged, all drugs that irritate the kidneys, and all foods that cause irritation should be withheld. While it has not been shown that meat will cause nephritis, it is not necessary to add meat to the diet in scarlet fever. Many believe that eggs should not be allowed. The withholding of eggs as a preventive of nephritis hardly seems necessary. Some physicians even withhold salt from the food; this does not seem necessary. In giving fluids, patients may be encouraged to take larger quantities by supplementing water with citrate solutions or lemonade. This not only aids diuresis but may also be of value in reducing acidosis. If the amount of urine greatly diminishes and albumin appears, there may not be an actual nephritis, but it may be well to attempt to forestall or abort such an inflammation. Hot packs or applications to the lumbar region can do nothing but good. A general body sweat is entirely inadvisable, and the value of profuse sweating in uremic conditions is even quite doubtful. Perhaps the best preventive of nephritis is prolonged rest in bed for at least a week after the fever has ceased, as it seems to be a fact that the better the action of the skin, the less likely are the kidneys to become inflamed, and the skin will be warmer, and is likely to be more moist in bed than when the patient is about. Pavloantonio (Abstr. *The Journal A. M. A.*, Jan. 10, 1914, p. 173) found that epinephrin, ten to twenty drops per day of 1:1000 solution, by mouth, was of aid in decreasing albumin and preventing uremia. Chilling of the body following scarlet fever is an important added cause for the development of nephri-

tis. Also, if the kidneys have been sufficiently irritated to cause a distinct predisposition to nephritis, an increased use of the muscles, whether by playing, exercise, or work, too soon after the acute symptoms are over, may so increase the excretory substances from muscle metabolism as to add a very tangible factor to further irritation of the kidneys and consequent nephritis. If nephritis develops, the treatment becomes that of acute Bright's disease.

H. Convalescence.—As just suggested, the patient should remain in bed one week after the fever has ceased, and the subsequent convalescence should be prolonged and carefully watched. During the acute stage of the disease the urine should be examined daily, to note the first appearance of albumin and how long it persists. During the convalescence the urine should be examined at least every other day for two weeks, and once or twice a week for several weeks more. The diet should be increased and most foods allowed, except that it may be well for at least two weeks not to give meat. During this period the patient should continue to receive iron. A simple bitter tonic may be advisable to stimulate the appetite. If the weather is cold and damp, great care must be taken that the patient be not exposed.

Just how long the germ of infection persists in the mouth, and especially in the nose, has not been determined, but secondary cases can occur when the patient, especially if he has a nasal discharge, has been allowed to play with other susceptible children. It was long thought that the desquamating skin was the cause of this late infection of others.

I. Use of Vaccines.—As it is conceded that streptococcic infection is concomitant with the cause of many of the complications of scarlet fever, vaccine treatment with stock vaccines or autogenous vaccines has been suggested and advised to hasten the eradication of left-over septic processes. The same rules and regulations, and the same frequency of success will doubtless occur in the septic processes following scarlet fever as with any other septic process. Vaccines have also been prepared of a micrococcus isolated from the pharynx—the *Micrococcus* "S" (*Schultze*)

—but the results have not warranted the belief that this is the specific organism. The use of antistreptococcus serum in large doses has been mentioned as of possible value in extremely septic cases. Also, it may be noted that some observers have reported striking results following injection of serum obtained from convalescent cases.

WHOOPIING COUGH

THE PROPHYLAXIS OF WHOOPING COUGH

The greatest mortality of whooping-cough is indirect. A large number of those infected die of such complications as bronchial pneumonia, capillary bronchitis, tuberculosis and a few from hemorrhages, while chronic debility, anemia, emphysema, and some lesion of the central nervous system are of not infrequent occurrence. In young children and infants, whooping-cough causes more deaths than measles, and some statistics show twice as many deaths as measles; 95 per cent. of deaths from whooping-cough occur during the first five years of life, and the majority of these during the first two years.

It is pretty well proved that the Bordet-Gengou bacillus is the cause of this disease. It seems to be established that the greatest infectivity occurs during the initial stages of whooping-cough, and that even during the active paroxysmal stage there is less liability of infection of others, and in the later stages there is probably no infective agent present.

Mallory and Horner confirmed the opinion that the Bordet-Gengou bacillus is the cause of the infection of whooping-cough. This is a minute bacillus, occurring in large numbers among the cilia of the epithelial cells of the mucous membrane of the trachea and bronchi. It is stated that the germ does not grow above the larynx, although of course by coughing it reaches these parts. This germ is a small coccobacillus, and resembles the bacillus of influenza.

This disease occurs largely in epidemics, and young children and babies are apparently most susceptible to the disease. This may be more apparent than real from two reasons: first, because young children, necessarily remaining more in the house, are liable more

frequently to come into contact with concentrated infected matter if an infected person comes near them, and secondly, because a large number of older children and the majority of adults have probably had the infection and have become immune. However, when an adult or elderly person acquires the disease it is almost invariably severe. The muscular strength of adults makes the paroxysmal coughing of much greater danger; they are more liable to emphysema, heart strain and hemorrhage. They are not so liable to have pneumonic complications. Whooping-cough, however, even in adult life, is a not infrequent stimulator of a latent tuberculosis. Often an adult, who is in close contact with a whooping-cough patient, and who may have had the disease in childhood, develops a mild form of the disease; at least they have the catarrhal symptoms and cough spasmodically occasionally. Whether the Bordet-Gengou bacillus is present in these cases has not been determined. It is a fact, however, that ordinarily one attack of the disease renders a person immune.

The incubation period of pertussis is not definitely known, and may vary from two to ten days; therefore before it is considered safe for a child exposed to this infection to return to school or to play with other children, at least ten days must have elapsed, and perhaps a better working rule is two weeks.

Pathologically, the disease manifests itself by a catarrh of the upper bronchial tubes, trachea, larynx and perhaps pharynx and nose. The secretion is mostly mucus, with perhaps, later, a mucopurulent discharge from secondary infections. There are conditions, moreover, caused by a severe paroxysm of coughing, or by a prolongation of these paroxysms, in other words, hemorrhages; perhaps more or less emphysema; always cardiac strain, and perhaps cardiac dilatation; and, if frequent or repeated coughing, anemia and emaciation. Hemorrhages may occur from the nose, in the eyes, or even in the brain.

The cough is laryngeal in type, is at first dry, and later becomes spasmodic and paroxysmal, thus differing from that of ordinary colds; that is, the coughs occur in series, more or less periodically, or in showers. With these paroxysms there is more or less closing

of the larynx, with the attempt at inspiration through a narrowed glottis, which causes the characteristic whoop. These paroxysms increase in frequency as the disease progresses, and are precipitated by any change in the atmosphere and by suddenly breathing in cold air, as by laughing, and even by swallowing food, and they sometimes occur without any apparent cause, because of irritation from the germ and its consequences. The number of paroxysms in twenty-four hours varies, but there may be as many as fifty. Early in the disease there may be a slight fever.

TREATMENT

Unless the patient has considerable rise of temperature, it may not be necessary to put him to bed, but, especially with children, the paroxysms are generally diminished if the child is kept in bed for a time, or at least kept quiet. The more active the child, the more paroxysms. Consequently, even without fever, if a child vomits almost every meal, or if he coughs so severely as to cause hemorrhages, or shows that the right side of the heart is becoming strained (which is the side of the heart most affected), he must be put to bed and remain there.

The actual treatment of this disease may be divided into four heads: (1) to prevent the infection of others; (2) to shorten the disease, if possible; (3) to diminish the severity of the paroxysms; (4) to treat complications as they occur.

The first indication has already been considered.

The second indication is met by general hygiene and by drugs. Fresh air and sunshine, without exposure, are among the greatest mitigators of this disease. If the weather is pleasant, the child should be out doors or on a veranda most of the time. If the weather is such that it is impossible to remain outdoors, he should be isolated in one, or better, in two large rooms, so that while one room is being thoroughly aired and cleansed he may go to the other one. There seems to be no question that the more infected or polluted the atmosphere of a room, the more the child will cough.

The Diet.—If the child vomits a meal as soon as he has eaten it, during a paroxysm, in a few minutes

he should be given food again, with the probability that the next paroxysm will not so quickly occur but that the food may remain in the stomach and be digested. A child that receives insufficient nourishment from any reason should be given food more frequently. The character of the food should depend on his condition, and should be that which is found to be less frequently vomited. The best diet is cereal and vegetable, with milk and eggs. The end-products of meat metabolism are likely to raise the excitability and irritability of any one whose nervous system is irritated. For this reason meat should not be given, and no tea or coffee. A patient who is not allowed meat should receive a small dose of iron once or twice a day. Calcium in any simple form may be used as a nervous sedative and a nutrient. Hot baths before going to bed relax the nervous system and quiet the patient. Also massage is sometimes soothing. Of course, it is always essential to have the bowels move daily. Plenty of water should be given the child, as the more moist the mucous membranes, the less they are irritated, and the less frequent the paroxysms. For this object many inhalants have been devised. Perhaps the most important element of these inhalants, whether sprays or steam, is the water that they contain. Sometimes bland petroleum oils atomized and inhaled soothe the irritated mucous membranes.

Various antiseptics have been suggested. The most frequently used is perhaps phenol (carbolic acid) in some form, and very popular has been the vaporization of a phenol combination in the atmosphere of the room. There is no question that phenol tends to benumb peripheral nerves. If much phenol was absorbed it would disturb the kidneys. Exactly what are the germicidal constituents or powers of such inhalants has not been determined. Phenol sprays have been used in from 0.5 to 1 per cent. strength. Antipyrin as a spray and gargle has been much used as a germicide in from 5 to 10 per cent. strength, and has been much lauded in this disease. Quinin sprays, though more disagreeable, have been used in the throat as germicides. Various combinations with thymol and eucalyptol, and other mild aromatic antiseptics, have been used as sprays and gargles or inhalants. It is

quite probable that a creosote or other antiseptic inhalant may inhibit the growth of germs in the trachea and upper large bronchi, provided the patient is old enough to cooperate and inhale the vapor into the lungs to that depth. As an application in the pharynx and mouth, hydrogen peroxid solutions, 1:5, would be as efficient as anything that could be offered. Many times, however, these "antiseptic" inhalants or atomizing substances cause irritation and paroxysms, and must be abolished, while mild alkaline solutions, well represented by $\frac{1}{4}$ teaspoonful of sodium chlorid and $\frac{1}{4}$ teaspoonful of sodium bicarbonate in a glass of warm water, cleanse and soothe the throat without causing paroxysms.

There are still many who believe that quinin given internally will shorten the disease. It has not yet been shown that quinin inhibits the growth of the Bordet-Gengou bacillus. If there is any tendency to secondary infection in the nasopharynx, with congestion of the ears, of course quinin should not be given.

Also, to meet this indication and shorten the disease is the vaccine treatment. The exact value of vaccine in this disease has not been demonstrated. Hartshorn and Moeller examined the reports of 1,445 cases treated with vaccines. It is their belief that this treatment is worthy of an extensive trial.

Immunizing doses, to prevent the development of the disease in other children of the family, have been given in doses of 20 million bacilli, and the dose repeated four or more times, and the disease has been apparently prevented by such vaccination. More recently Hess has made a careful study of the vaccine treatment of whooping-cough, and was disappointed in this treatment of the disease; but he did find that in a certain percentage of cases immunizing doses prevented the development of the disease, although this prophylaxis was far less efficient than is typhoid vaccine in preventing typhoid fever. Positive conclusions, therefore, as to the value of vaccine treatment in whooping-cough cannot yet be made.

The third indication, namely, to diminish the severity of the paroxysms, is of great importance. It has already been stated that the more quiet the child, the less frequent will be the paroxysms. Also, if the child

lies down as soon as he begins to cough, he is less likely to vomit. An elastic abdominal belt seems to be of value in controlling the vomiting and the paroxysms of young infants especially. In some patients the paroxysms are so severe that chloroform inhalations have been given to prevent the intensity of the spasms. Also, it has been stated that inhalations of chloroform actually lengthen the time between the paroxysms and shorten the disease. Chloroform inhalations may act as a germicide. On the other hand, the frequent administration of chloroform, even in small doses, is known to injure both heart and kidneys.

The most effective of all medicinal treatments, in the opinion of several authorities, is antipyrin and digitalis. A very good rule for the dosage of antipyrin is 0.05 gm. (about 1 grain) for every year of the child's age. This should be given three or four times a day, depending on the frequency of the paroxysms. It should not be continued indefinitely nor used to excess. Of course this rule is not applicable for higher ages. The frequency should be diminished as the frequency of the paroxysms diminishes. Coincident with the antipyrin should be given digitalis in the form of the tincture, and in the dose proper for the child's age, and determined by its effect on the child's heart and pulse. The heart needs help, both from the strain of the disease and also as antipyrin might cause some weakening of the heart. The antipyrin acts by causing less irritability of the nervous system and relaxing muscle spasm. Even though the drug has disadvantages, its disadvantages are much less than the harm caused by the whooping-cough paroxysms.

The bromids have been frequently given and in large doses. They act by inhibiting the reflex activity of the nervous system and by more or less dulling the peripheral nerves in the throat and upper air passages. Chloral has been used in order to depress the nervous irritability. Atropin or belladonna have been given in large doses, and their value must be in dulling the peripheral nerves in the irritated part of the body. Atropin is a stimulant, and cannot have any good effect in this disease, unless the dose is very large, and with such large doses atropin intoxication readily occurs, that is, the pulse becomes rapid, the throat dry,

the face flushed, and there is likely to be cerebral excitation and perhaps dilated pupils.

Antipyrin is best given to a child in solution, as follows:

| | Gm. or c.c. | |
|----------------------------|-------------|--------|
| R Antipyrinae | 5 | 3 iss |
| Aquae menthae piperitae... | 100 | ℥ss iv |

M. et Sig.: A teaspoonful, in water, three or four times a day.

This dosage is for a child 5 years old.

Various hydrotherapeutic measures are often of value, and the hot bath is always useful in quieting the patient and relieving internal congestions.

The fourth indication, namely, to treat complications as they occur, is almost supererogation, as each complication calls for its proper treatment. However, under this heading the prevention of such complications may be urged. Vomiting may be prevented by quiet, rest for a while after eating, by the abdominal belt and by proper food. Nutrition must be kept up at any cost, and, if necessary, the child given simple liquid nourishment every three hours. Not infrequently cod-liver oil is well borne and is an oil-nutrient of great value. Anemia must be prevented by iron. If it is seen that the heart is becoming strained, and the face and throat remain congested even after the paroxysm is over, showing that the right ventricle is in trouble, digitalis should be given and such rest as would be given any damaged heart. This treatment also tends to prevent hemorrhages. Even if the child is weak and the circulation is weak, strychnin is inadvisable, as it stimulates the nervous system and causes or allows more paroxysms to occur.

If the child has a history of enlarged glands or recurrent colds, or has inherited a tendency to tuberculosis, or tuberculosis has been present in the child's family, its convalescence after whooping-cough should be prolonged, and country or seashore air should be urged where possible. Certainly, such a child should not be confined in school until its nutrition has become as good as before the infection with whooping-cough occurred.

DIPHTHERIA

This throat inflammation, now termed diphtheria, has been known for centuries, having first appeared in the East and later in Europe, occurring mostly in epidemics. A carrier of this disease may communicate it to persons so widely separated as to make the occurrence of the disease almost unexplainable by any epidemic theory. While nearly all mankind is susceptible to smallpox, and a large majority to scarlet fever, many persons seem naturally immune to diphtheria. Also, a closer contact is apparently needed with an infected individual than in these other diseases.

This disease has always had a large percentage of deaths; but the death rate since the introduction of antitoxin has been constantly on the decrease, and with a better understanding of the proper dosage of antitoxin, and with the effort made to diagnose the disease early, the death rate will be more rapidly decreased. Our best sanitarians believe that for every case of diphtheria recognized, at least one sore throat that carries the Klebs-Loeffler bacillus escapes; in other words, there is an equal number of missed mild cases.

It has been shown that the normal hydrochloric acid in the stomach inhibits or kills the diphtheria bacilli; therefore it is exceedingly rare to find these germs in the intestines, and very rare to find diphtheritic membrane in the stomach.

In the majority of cases the tonsils, one or both, are the parts affected in diphtheria, and with the present methods of treatment, in a large portion of these cases the membrane will be limited to these regions. The soft palate is next most frequently attacked, the pharynx next, and nasal diphtheria, with proper care taken, is not very frequent. Laryngeal diphtheria is not a frequent complication to tonsillar diphtheria; it generally begins as the original point of attack.

CARRIERS

These may be convalescents from diphtheria, or may be those who have had contact with diphtheritic patients who may or may not later develop the disease, or the term may be perhaps more properly limited to those who carry the germ for months. Diphtheria

germs may live a long time on books or other substances, handled, coughed, sneezed or expectorated on by a diphtheria patient, and may infect persons coming in close contact with such infected material. This method of infection may not be very frequent. Animals may carry the infection. It is doubtless a good axiom to believe that a tonsillitis with exudate is diphtheria until it is proved not to contain the Klebs-Loeffler bacillus. Such a patient should be more or less rigidly isolated, as streptococcic infection is, if anything, more readily communicated than is a diphtheria infection. Therefore, there can be no excuse for not isolating a sore throat with exudate or membrane as soon as such a case is discovered.

The location of the Klebs-Loeffler bacillus in carriers who are convalescing is probably most frequently in the throat, though the bacillus may be found in the nose. In those who carry these germs long they are more likely to be found in the nose. Therefore, swabs should be taken of both regions. It is quite probable that a surface swab from a tonsil may be negative while a culture obtained from probing into crypts of the tonsils or in the region back of the tonsil might show the presence of the germ. It is culpable neglect to fail to examine a patient thoroughly to ascertain if he is free from the Klebs-Loeffler bacillus.

The boards of health vary as to the number of negative cultures that will release a patient from quarantine. The safest number is perhaps four negative cultures, two from the throat and tonsils, one from crypts or back of the tonsil, and one from the nose, taken on alternate days, at a considerable interval from the use of any antiseptic washes, gargles or sprays. This would seem to prove that a patient was free from the Klebs-Loeffler bacillus.

TREATMENT OF CARRIERS

Various methods of ridding a carrier of the diphtheria germs have been tried. Local measures vary, and may comprise painting the suspected regions with tincture of iodine or with Lugol's solution, with silver solutions, phenol solutions, or the use of various gargles, hydrogen peroxid solutions, etc., and the nasal inhalation of various thymol or iodine inhalants or

sprays. There is no question that whatever else is done, some local antiseptic should be applied. Diphtheria antitoxin injection has not been very successful. Local applications in the mouth, throat or nose of antidiphtheritic serum have not been proved to be very successful. Vaccinations with dead diphtheria bacilli have been only partially successful. These various methods are described by Albert. He believes that a local application to suspicious crypts of the tonsils of a "5 per cent. solution of silver nitrate will destroy all bacteria with which it comes in contact." A thorough application of a 10 per cent. solution of silver nitrate he finds will cause some destruction of the epithelium of a crypt and a fibroblastic proliferation with ultimate obliteration of the lumen, which is of course the object desired.

Very successful treatment of diphtheria carriers seems to be spraying the nose and throat with pure cultures of *Staphylococcus pyogenes aureus*. This spray is apparently harmless to the individual although reports of severe infections have been published. This method was first used by Schiøtz, in 1909. Although it is not always efficient, in some instances it has removed the Klebs-Loeffler bacillus and prevented its growth so that cultures were negative to it in a week or less. It has not proved very successful in nasal cases. On the other hand, Womer, after using this staphylococcus spray in forty-two cases of diphtheria carriers, comes to the conclusion that although it is harmless, it does not appreciably lessen the period of quarantine. This leaves the value of this treatment still subject to positive proof. It may certainly be tried.

Wood thinks that in one or two instances, in diphtheria, spraying the affected areas with live lactic acid bacilli hastened the disappearance of the diphtheritic germ. Antiseptics should not immediately be used in the throat after such spraying, as he thinks it is the live bacilli that act perniciously on the diphtheria bacillus. This suggestion is worthy of further investigation.

Miller recommends that diphtheria carriers have their throats sprayed with warm formaldehyd solutions every three or four hours during the daytime. The strength which he recommends to begin with is 0.25

or 0.5 per cent. in water of a 40 per cent. formaldehyd solution. [The official Liquor Formaldehydi is a 37 per cent. solution.] This solution may be increased in strength to 1 per cent. if deemed advisable. He found that in from three to six days the diphtheria bacilli disappear from the throats of carriers thus treated. He urges that the solution be prepared fresh each day. He did not find that the kidneys were irritated by such treatment.

Hektoen and Rappaport (*Jour. A. M. A.*, June 12, 1915, p. 1985) have found that, when properly applied, kaolin in the form of a dry powder removes not only diphtheria bacilli, but also practically all bacteria from the nose in the course of from three to four days. For this purpose the kaolin is blown into the nose six or seven times a day at two-hour intervals by means of a rubber bulb attached to a glass tube, the free end of which tapers a little. The insufflation is repeated several times at each treatment. The success of this treatment appears to depend largely on the free and thorough distribution of kaolin over the nasal surfaces. In cases of more or less obstruction of the nasal passages, the removal of bacteria by insufflation is more difficult.

In order to secure the most thorough application of kaolin to the mucous membrane of the throat, patients, if old enough, are instructed to swallow as slowly as possible one-third teaspoonful of kaolin four or five times an hour during the day. In the case of adults and older children who are anxious to get rid of diphtheria bacilli, this method, which has been selected after trial of several others, involves no special difficulty. In the case of small children, it is more difficult to apply enough kaolin, and the plan of mixing the kaolin with sugar in the form of tablets is being considered. In a number of cases, in some of which there were a great many diphtheria bacilli in the throat, complete and apparently permanent removal has been accomplished by means of kaolin in the way described in from two to four days, the throat to a large extent being freed from all bacteria.

They have found also that the insufflation of kaolin into the nose in cases of rhinitis in scarlet fever appears

to improve the condition rapidly and to remove streptococci and other bacteria quite promptly.

They have not found kaolin to be irritative; when taken into the mouth it gives rise to a feeling of grittiness.

It seems, then, that kaolin, and probably also other substances of a similar nature, may prove of value in removing bacteria from various surfaces of the body by virtue of mechanical adsorption. This may prove of advantage, not only in carriers, but also in conditions of acute infection.

IMMUNITY

While it has been long known that infants and many adults seem not to be susceptible to diphtheria, it has only lately been shown that probably a large proportion of adults, stated at 90 per cent., perhaps 50 per cent. of children, and perhaps 80 per cent. of newborn infants have diphtheria antitoxin in their blood and are not likely to become ill with diphtheria.

A skin test has been devised, known as the Schick reaction, to determine whether or not an individual is protected against diphtheria, that is, whether he has diphtheria antitoxin in his blood. The reaction seems very positive, and distinctly shows that an individual is artificially protected or has natural antitoxin against this disease. The test is made with a dilute diphtheria toxin of such strength that 0.1 c.c. contains one-fiftieth of the minimum fatal dose for a guinea-pig. This amount, namely, 0.1 c.c., is injected into the layers of the skin, perhaps best on the inner surface of the arm. A positive reaction should appear in from twenty-four to forty-eight hours, and is evidenced by a slight swelling and localized redness, a reddened papule which remains from seven to ten days. When this papule disappears, the skin over it may desquamate slightly, and pigmentation may remain for days and even weeks. Park states that the injection is best given with a small hypodermic syringe with a platinum point needle, that the injection must be into the skin and not subcutaneously, and that immediately after the injection there should be a raised whitish spot, which in twenty-four hours becomes bluish, with a slight edema. Schick's interpretation of the positive reaction, as just

described, is that the patient has no antitoxin in his blood, or at least less than 1/30 unit of antitoxin in 1 c.c. of blood. He declares that all persons so reacting are susceptible to diphtheria, and Park agree with him. Park, in his summary on immunity in diphtheria, states that according to Hahn the interval between the injection of vaccine and the development of antitoxin is not less than three weeks, while other investigators think that it may be eight days. Persons who have a natural antitoxin show an earlier increased antitoxin production. Von Behring considers that 0.01 unit of antitoxin per 1 c.c. of blood is sufficient to protect a healthy individual, and much less may protect against diphtheria.

Immunizing doses of antitoxin to persons who have been exposed to diphtheria, given early, are generally successful in preventing the development of the disease. The immunizing dose for a child should probably be at least 1,000 units. Doubtless adults should receive larger doses.

TREATMENT

A. Isolation.—It should be again urged that a throat with spots or membrane should be considered as likely to be diphtheritic until a culture has proved it not to be. Such a patient should be isolated in the best room available, looking toward the possibility of the disease being diphtheria and a nurse being required. Other children of the family must be excluded from contact with this patient. If the case is clinically one of follicular tonsillitis, the physician may wait for a positive test before giving antitoxin. If, however, the case is clinically diphtheria, antitoxin should be given without a report being waited for, provided there is nothing in the history of the patient to show that there will be any hypersusceptibility to horse serum. Whether it is follicular tonsillitis, or other streptococcic infection, or diphtheria proper, gargles and local cleanliness of the throat should be immediately inaugurated, and when this is properly carried out, the danger of infection of others is reduced to a minimum.

It is hardly necessary in this day, in which the advisability of sunlight, a large room, an adjacent

bathroom, the absence of all unnecessary draperies, furnishings, rugs, etc., for a proper isolation room are so well understood, to describe the needs in detail. Instruction should be given the family in the minor details of the prevention of infection of others. A properly trained nurse well understands the necessity for burning wooden tongue depressors, wooden swabs, the gauze and cotton used around the patient's nose and mouth, and washcloths; the use of liquid soap; simple but effective cleanliness of the patient's face, hands, and body; boiling of all eating and drinking utensils; disinfecting the toothbrush with non-poisonous germicides; allowing the bed clothing and bed garments to stand in germicidal solutions before being sent to the wash; frequent washing of her own hands in germicidal solutions; and gargling her own throat with hydrogen peroxid solutions. These are all subjects of general knowledge by physicians and nurses.

B. General Care of Patient.—High fever is not frequent in diphtheria, unless the case has been neglected. Consequently, the patient should receive, almost from the beginning plenty of nutritious food. The exact diet, of course, depends on the age of the patient. Milk, oatmeal gruel, eggs, meat juice well salted, toast, butter, and the whole, or the juice, of one or two oranges, would represent the food needed. With or without meat, it is well to give a diphtheria patient iron, and no preparation is better than the tincture of iron chlorid in 5-drop doses, three times a day, given in fresh lemonade or orangeade, after nourishment.

However well the gastric juice inhibits the growth of the bacteria, it is always wise for a patient to gargle, or be sprayed, before taking food, so that the mouth and throat will be as clean as possible.

The bowels should be moved daily by some simple laxative, if they do not move without such help.

While a diphtheria patient should have plenty of fresh air and all the sunlight possible, he should be kept warm. He should not be allowed to become chilled, as the toxins of this disease cause depression and the patient's temperature may be quite low, and the hands and feet easily become cold. Even if the temperature is high, the bathing should be by warm sponge bath.

C. Antitoxin.—Recent investigations by Schick show that the dose of antitoxin advisable for ordinary cases of diphtheria can be based on the weight of the individual. Schick finds that 100 units of antitoxin per kilogram of weight is sufficient to combat the toxin in diphtheria in all ordinary cases, and in severe cases 500 units per kilogram is more than sufficient. In other words, enormous doses of antitoxin are not needed, which has long been the belief of Park of New York. This is especially true if the antitoxin is given early. A kilogram equals $2\frac{1}{5}$ pounds avoirdupois, and a child weighing 45 pounds, in an ordinary case of diphtheria, should be given 2,000 units of antitoxin; while if the case is severe, or in nasopharyngeal or laryngeal types, 10,000 units would be all sufficient. By the same method of decision as to the dose, an adult of about 130 pounds should receive 6,000 units in a mild case, and 30,000 units if the diphtheria is of malignant type, or has affected parts where the danger of absorption is greater.

It seems quite probable that if such doses can be administered on the first day of the infection with the Klebs-Loeffler bacillus, no more antitoxin will be needed in such cases, and that death from this disease will be reduced to a minimum.

Smith and Park have shown that when antitoxin is given subcutaneously, it takes from three to four days before the maximum amount of antitoxin is circulating in the blood. If the antitoxin is given intramuscularly this period is shortened. From these findings, therefore, the conclusion should be made that if the case is urgent and the toxemia serious, antitoxin should be administered intravenously; if the case is severe and the diagnosis has not been made early, antitoxin should be given intramuscularly; in ordinary or mild cases, and on the first day or two of the disease, it may be administered subcutaneously.

D. Care of the Throat.—It would be just as sensible to perform a major operation with the most perfect technic and yet take no means whatever of preventing infection, as it is to administer antitoxin in proper dose in diphtheria and then to take no proper care of the throat. All odor and all danger of secondary

infection are removed by proper treatment of the part affected. Although germicides cannot kill the germs deep in the mucous membrane, or those that are protected by an overlying exudate, a certain large portion of the surface bacteria are surely killed by as simple a gargle as hydrogen peroxid solution. More active and more irritant germicidal gargles or germicides that are sources of danger when swallowed, are entirely unnecessary in diphtheria.

If the child is old enough to gargle or swash the tonsils, this is the best method of cleansing the throat. If the child is not old enough, thorough spraying of the throat should be done. A solution of one part of the official Aqua Hydrogenii Dioxidi to 3 parts of warm water, freshly prepared each time, should be used as a gargle, every one and one-half or two hours during the day, and every three hours during the night. Three or four minutes after this gargle has been used, it should be followed by some simple alkaline wash, to remove the irritant effects of the hydrogen peroxid. A gargle that may be used for the secondary cleansing purpose is a teaspoonful of boric acid added to $\frac{1}{2}$ glass of warm water. This will not all dissolve, but will deposit on the throat and act as a mild antiseptic. Also, there is no greater promoter of mucous secretion of the throat than boric acid; and the more the mucus is secreted, the quicker will the membrane be loosened. Or, a simple solution of $\frac{1}{4}$ teaspoonful of salt and $\frac{1}{4}$ teaspoonful of sodium bicarbonate may be added to $\frac{1}{2}$ glass of warm water. The object of such a gargle and wash is to cleanse the mouth and throat of froth and pieces of membrane, mucus, mucopus, etc., and to soothe the membrane. It is frequently advisable to insufflate boric acid directly on the masses of membrane or exudate. This should be done by the physician.

After the throat has been cleansed all that is possible, it is often of value to apply tincture of iodine to the membrane or exudate. Care must be taken not to touch the healthy membrane with this solution. Lugol's solution may be applied to the parts of the throat that are not affected, which often tends to prevent development of more exudate or membrane. If there are pockets and crypts in diseased tonsils, after

cleansing such, boroglycerid may be applied to heal and to prevent spreading of infection.

As frequent gargling is very tiresome for the throat, swashing is nearly, if not quite, as efficient, and should be suggested. If the child is too young to gargle or swash, the peroxid should be sprayed on, and the solutions for this purpose should be stronger, namely, 1 part to 2 parts of warm water. The cleansing spray may be used afterward. If the throat and mouth generally are irritated, a soothing gargle is as follows:

| | Gm. or c.c. | |
|-----------------------------|-------------|---------|
| R Acidi borici..... | 2 | gr. xxx |
| Potassii chloratis..... | 5 | 3 iss |
| Aquae menthae piperitae.... | 200 | fl5 vii |

M. Sig.: Use undiluted as a gargle, as directed.

Of course, any other flavor than peppermint could be used in this mixture.

Whether or not it is advisable to use a weak hydrogen peroxid solution in nasal diphtheria is a question for individual decision of the physician; generally it is too irritant, even when used weak, and is inadvisable. Cleansing mild alkaline solutions or boric acid solutions represent the most successful treatment of nasal diphtheria used as sprays or snuffed through the nostrils. Such mild, warm solutions may be poured from a small vial or from a teaspoon into the nostril, with the head thrown back. It is inadvisable to use any of the douches that are on the market, or any syphon douche, as the pressure is too great, and fluid is often forced up the eustachian tube or into some of the sinuses. Suprarenal extract may be added to these solutions, if deemed advisable, but it should not be used too frequently. Also, the nose should not be sprayed too frequently.

As soon as the throat is clean, the frequency of the gargles should be diminished, but it should be several days before the patient is not awakened at night to gargle at least once, or better, twice.

The treatment of the throat advised for diphtheria is equally applicable to follicular tonsillitis or scarlatinal throats, and to septic sore throat.

E. General Medication.—A diphtheria patient requires very little general medication, unless some

complications occur. In the beginning a small dose of calomel, or a dose of castor oil may be advisable, and subsequently whatever simple laxative is needed to cause a daily movement of the bowels. The temperature does not often call for treatment. If it is high, or there is headache and backache and general aches, two or three small doses of a coal-tar antipyretic may be given. The following combination for a child not under 10 years old is efficient:

| | | |
|---------------------------|-----|-----------|
| | Gm. | |
| ℞ Acetphenetidini | 1\| |  |
| Phenylis salicylatis..... | 1\| | ãã gr. xv |
| M. et fac chartulas v. | | |

Sig.: A powder every three hours, if needed.

Later, if the temperature is high, tepid sponging is sufficient, but generally, with the ordinary low temperature of diphtheria, hot sponging for cleanliness and to increase the activity of the skin, and to remove the perspiration, should be done once or twice daily.

As suggested above, every patient with diphtheria should receive iron, either the tincture of iron chlorid, a few drops in fresh lemonade, or a 3-grain tablet of eisenzucker, three times a day, or 0.10 gm. ($1\frac{1}{2}$ grains) of reduced iron, in capsule, three times a day. If there is a tendency for the throat or nose to bleed, it can do no harm to add lime water to the diet, and it may be of value.

On account of the nervous depression caused by the toxins of the Klebs-Loeffler bacillus, a small dose of strychnin, not exactly as a cardiac stimulant, but more as a nervous stimulant, is advisable, provided the condition of the patient seems to require it. For a child 10 years old, $\frac{1}{60}$ grain of strychnin sulphate, once in six hours, is generally a sufficient dose. If the child is made nervous by strychnin, it should certainly be withheld. A little coffee or tea may be given a child, as a medicine for the action of the caffein, and is of value.

F. Care of the Heart.—Although it was long considered that heart failure in diphtheria was due to vasomotor paralysis, or to action on the vasomotor center, it has been shown by Porter and Pratt that such is probably not the case: that heart failure is probably due to the action of the toxins on the heart

itself. Dr. F. W. White of Boston long ago showed that the heart was frequently affected more or less seriously in diphtheria. White also quotes many other authorities showing that myocarditis is not an infrequent complication, that valvular disease may occur from diphtheria, and that even a chronic myocarditis may persist, or a valvular lesion may continue for months or even years, or for life. The mitral valve is the one most frequently diseased, and if a lesion is caused, it is generally insufficiency. About 60 per cent. of the patients with diphtheria show an irregular pulse, and the younger the patient, the more liable he is to have this heart irregularity. It may occur even in mild cases. The murmur at the apex is doubtless due to a relative insufficiency of the mitral valve, because of slight dilatation of the left ventricle. In this investigation, necropsies showed that endocarditis and pericarditis are extremely rare complications in diphtheria.

Clinically, the gallop rhythm, with or without vomiting and epigastric pain and tenderness, is a bad symptom in diphtheria. This gallop rhythm of the heart is very serious, and if accompanied by vomiting, the prognosis is very bad. Hume and Clegg, after an investigation of 573 cases of diphtheria, declare that any form of arrhythmia of the heart (except sinus arrhythmia) in diphtheria indicates that the heart muscle or nerves are pathologically disturbed. This may occur even when the diphtheria is apparently mild.

After a patient is apparently well from diphtheria, if he has been severely ill, and especially if the case has been neglected and a large amount of toxins have been absorbed, cardiac failure may occur any time from the second to the fifth week. Symptoms of late cardiac weakness are often a slow, weak pulse. Such hearts, however, become rapid on the least exertion. Such patients are often very pale, and there are liable to be more or less gastro-intestinal disturbances.

There can be no question that the effects on the heart in diphtheria are due to the Klebs-Loeffler bacillus toxins; consequently, if antitoxin in sufficient dose is given early, the toxic effect on the heart will probably rarely occur. Consequently, cardiac deaths in diph-

theria will be less frequent with the early proper administration of antitoxin.

The most important treatment of cardiac complication is rest, and prolonged rest. A patient who has shown cardiac inflammation of any kind, or cardiac irritation during diphtheria, should have a prolonged rest in bed and a very slow convalescence. The small dose of strychnin suggested above as a nerve stimulant is probably sufficient. If the heart is very rapid, it may be unwise to give even this small dose. Larger doses do not seem to raise the blood pressure during illness, and strychnin in large doses as a cardiac tonic, in prolonged weakness, is not so successful as has been thought. In an apparently acute failure, a fair-sized dose, $1/40$ grain for a child 10 years old, may be given hypodermically; but to persist in large doses of strychnin is inadvisable. Digitalis is not indicated, and alcohol should not be given. Caffein and camphor may be worth while; but the main thing is absolute rest, small amounts of food, the least possible disturbance for bathing, feeding, defecation and urination, and no prostrating purgatives.

G. After Rest.—A patient who has recovered from diphtheria, however mild it may have been, should have, for the first two weeks, at least, a carefully watched convalescence. Strenuous exercise should be avoided, and the heart should be carefully examined before the patient is allowed to return to his usual work, school, or play.

H. Paralysis.—With the early injection of a sufficient dose of antitoxin, diphtheria paralysis will become less and less frequent. The paralysis of the soft palate, which used to be so frequent, is already becoming infrequent. This paralysis occurs early, between ten and twenty days from the beginning of the illness. The treatment consists of tonics, small doses of strychnin, the best of nutrition, fresh air, sunlight, rest, and prolonged convalescence. The general paralyses, which are now rarely seen, were more serious, and occurred later. They are slow in recovery, and besides general treatment, require massage and electricity.

I. Diseased Tonsils.—Quite probably diseased tonsils cause a susceptibility to diphtheria, as they certainly do to follicular tonsillitis. After complete recovery from a diphtheria attack, when the general condition is perfect, and the heart is in good condition, operations should remove all portions of tonsils that show disease. Whether complete enucleation should be done, or only diseased portions should be removed, and whether or not the capsules should be left, are subjects for an expert decision.

LARYNGEAL DIPHTHERIA

Membranous croup is laryngeal diphtheria, and as soon as the diagnosis can be made that there is exudate in the larynx or laryngeal region, antitoxin should be given in large dose, without waiting for a decision from the laboratory that the Klebs-Loeffler bacillus is present. The only safe place for a patient with laryngeal diphtheria is a contagious disease hospital, where expert skill in intubation and, if necessary, in tracheotomy can be quickly obtained. The main danger from diphtheria in this location is suffocation.

The toxemia is not great, and the absorption is much less than in nasal, nasopharyngeal, or even in tonsillar diphtheria.

The best of nutrition is important, as exhaustion from labored breathing is likely to occur. The atmosphere of the room is better moist, on account of the membrane becoming dry and causing more obstruction before it loosens and is coughed up. Just how much local steaming of the throat, or inhalation of various medicated solutions should be given, is to be decided by the individual physician. The main advantage is doubtless from the vapor of water.

The main requirements to be remembered in laryngeal diphtheria are the administration of an immediate large dose of antitoxin; intubation by a skilled operator as soon as indicated; a trained nurse skilled in intubation cases, if such can be obtained; the ability to recall quickly the physician who intubated if the tube is coughed up; the immediate removal by the nurse of the intubation tube if it plugs up, and the quick performance of tracheotomy by the surgeon, if such a measure is needed.

SEPTIC SORE THROAT

For some years there have been reported in England epidemics of septic sore throat, some of which have been distinctly traced to infected milk, and all of which probably develop from that source. In the last few years several cities and towns in this country have suffered from epidemics of this character, and in every instance it has been traced to milk from one dairy, and ultimately to one or more diseased cows. The disease that causes such infection is an inflammation of the milk glands, a mastitis, or an inflammation of the udder termed garget. Another possible source for the dissemination of this germ is an infected throat of the milker, or of some one who handles the raw milk.

The germs found in the inflamed udders, in the raw milk, and in the throats of those infected are the same, namely, the *Streptococcus pyogenes*.

The clinical symptoms have been the same in all of these epidemics, and Capps states that the throats generally show intense hyperemia without a grayish exudate. The cervical lymph glands enlarge, and may suppurate; there is extreme prostration, and a tendency to relapse. The complications are inflammation of the middle ear, abscess around or about the tonsils, and erysipelas or other skin eruptions. The most dangerous and fatal complication is peritonitis, and there may be fatal septicemia, with localization in the lungs. Endocarditis, myocarditis, arthritis, and nephritis may occur as complications in this septic process.

Means of prevention of septic sore throat in epidemics must include a more frequent bacteriologic examination of the udders of cows and of the throats of those who handle raw milk. Pasteurization of milk would prevent these germs from causing infection.

The treatment of these septic sore throats is not different from that of follicular tonsillitis, namely, dilute hydrogen peroxid solutions 1:4, immediate subsequent washings with mild alkaline cleansing solutions, and the local application of a weak iodine solution, as Lugol's solution (too strong iodine preparations might increase the swelling and hyperemia of the throat).

On account of the prostration, the patient should receive plenty of nutriment. The bowels should be moved daily. Pain should be stopped, if it is troublesome, by codein or morphin, if deemed advisable. High temperature should be treated as seems best, and the complications combated as they occur. Infection of others is prevented by the same methods as those described for diphtheria. The blood in this disease should be studied, not only to determine the amount of leukocytosis, and the type that is probably present, but also to determine the amount that gives a favorable prognosis. Such studies may give a clue as to the possible value of an autogenous vaccine.

GERMAN MEASLES

This is a highly contagious germ disease, most frequently affecting children and youth. It generally occurs in epidemics, but a considerable number of persons exposed to the disease do not acquire it. While the germ has not been discovered, and though it is not known just how it is transmitted, the probability is that the secretions of the nose and throat are the means of spreading the infection. It is doubtful if the eruption or the desquamating epithelium carries the contagium. The stage of incubation is apparently long, averaging perhaps from about ten days to two weeks. The stage of invasion is rarely seen, as when it is first realized that the patient is ill, the eruption is present. The eruption is a maculopapular one, reddish, and rarely confluent. The papules are less raised than in measles; in fact, many points of eruption are purely macules. The color is brighter than that of measles. It occurs first on the chest and face, and then gradually spreads over the body, during the first twenty-four hours. Questioning of the person attacked often shows that there were slight rigors and some backache or headache or feelings of indisposition. The temperature is generally slight, rarely above 100 F.

Complications are rare, and although the patient should be confined to the house, the infection is simple, and there are not likely to be any consequences.

This disease requires, ordinarily, no real treatment. Simple cathartics should be given, the diet reduced,

and the patient kept indoors until the eruption has disappeared. If the throat is irritated, an alkaline gargle should be used. The usual simple methods of preventing the infection of others should be carried out.

The disease should be made reportable, as it is so often confused with regular measles, and rarely has been confused with mild scarlet fever. It is more likely to be confounded with various kinds of intestinal or food poisonings that cause eruption.

CHICKEN-POX; VARICELLA

This simple, acute, contagious disease, generally very mild, and rarely requiring any medication or treatment, need not be mentioned here except that it is frequently confused with smallpox.

In chicken-pox: The incubation period is at least two weeks. There is no definite history of a previous attack of this disease. A history of successful vaccination within a few years, or a definite history of a previous smallpox causes presumption that the disease is chicken-pox. There is usually no history of a stage of illness before the eruptive stage. The eruption appears in the first twenty-four hours of the disease, beginning on the back, chest or face, and is most profuse on parts of the skin covered by clothing. The eruption appears in successive crops on successive or alternate days, so that various stages of the lesions may be present at one time. The lesions are round and oval, and the margins are not crenated. The eruption passes through the following stages: 1. Macules lasting a few hours. 2. Soft, superficial papules lasting a few hours. 3. Clear, thin-walled, tense vesicles each lasting a few hours (these vesicles may be readily broken and appear cupped or pitted, and the weeping vesicle then quickly becomes crusted). 4. The crusts, lasting a shorter or longer time, depending on the treatment (each crop completes its cycle from macule to crust in from two to four days). 5. Pitting may occur, but the pits are few, superficial, and often oval.

It is essential that chicken-pox cases should be early diagnosed, and that the patient should be isolated. A laxative should be given; the diet should be simple

and without meat; warm baths, and powder to prevent itching, represent the only treatment generally required. Older patients should be cautioned, and children should be prevented from picking open the vesicles that occur on the face, thus preventing pitting. Young children should wear celluloid mittens.

MUMPS

This is a highly infectious disease, with a long period of incubation, from two to three weeks. There is more or less of it always present in most cities, and there are likely to be epidemics of it in certain seasons of the year, more particularly, perhaps, in the spring and fall. Children and youth, especially boys and young men, are the most susceptible to it. Infants and adults are not so likely to have it. Possibly adults are less likely to have it because they have been rendered immune by unrecognized mild attacks in childhood.

While the typical localization of this infection is in one or both parotid glands, the submaxillary glands may be coincidentally involved, or may be the only glands involved. As simple and harmless as this disease generally is, it may cause very high temperature, sudden cardiac failure, and frequently in young boys and male adults a complication, or metastasis, of orchitis, which is always serious. In girls the mammary glands or the ovaries may show metastatic inflammation.

A patient with the disease should generally be isolated, and the attack will often be milder if the patient remains in bed. Although the disease can be serious, it is generally so mild in children that it is sometimes a question whether other children of the same family should not be allowed to contract it, for the reason that one attack generally confers immunity for all time, and the disease is much more serious in adults, especially in young men, than in children. Of course, an infected child, even though very mildly sick, is immediately sent home from school. On the other hand, doubtless not a few children with very mild cases are unwittingly allowed to remain at school.

TREATMENT

The disease is so mild that it may not require any special treatment. Pain in the infected glands is rarely severe, and is modified by dry warmth or simple absorbent-cotton applications, and by any oily application, the latter to relax the tension of the skin over the swollen gland. For this purpose olive oil may be used, or petrolatum, or an ointment may be made with 10 per cent. methyl salicylate in petrolatum. It is inadvisable to use ice or cold applications to the parotid glands in mumps.

The diet should be mild, the bowels kept free, and in simple cases medicinal treatment is not needed. If the fever is very high, one or two doses of antipyrin or acetanilid may be given, with the knowledge that cardiac depression readily occurs in this disease. Hot drinks, as hot lemonade or hot tea, with a little alcohol in some form for its physiologic action in dilating the peripheral blood-vessels and promoting perspiration, is a satisfactory method of reducing the temperature. Tepid sponging may be of benefit, and hot sponging should be given the patient daily if he is too ill for a hot bath.

If a testicle is affected, the lesion is generally an orchitis, or it may be an epididymitis. Ice and cold applications are inadvisable in this metastasis from mumps. Warm, moist applications often relieve pain; but if the testicles are kept elevated and surrounded by absorbent cotton, and if perhaps some oil or fat, such as petrolatum, is applied, the inflammation will probably go away as rapidly as by any other treatment. Strapping is inadvisable in this complication. Any massage, or the rubbing in of any ointment or other preparation in this kind of orchitis, or to the parotid glands, is inadvisable in mumps. Ichthyol applications in from 10 to 20 per cent. strength, either in petrolatum or in olive oil, or glycerin and water, have been largely used locally in this inflammation. Lead and opium wash has been frequently used; but the less this inflamed gland is manipulated, the better.

If the mammary gland becomes metastatically inflamed, the treatment is about the same as that for the parotid. If it is decided that the ovary is inflamed

but little can be done, except absolute rest and the administration of a sedative if there is pain. If there is much pain from any of these inflamed glands, morphin or codein may be advisable if it seems unwise to give a coal-tar analgesic.

MENINGITIS

This disease occurs in epidemic and sporadic forms, the latter form being often difficult to diagnose. While young children and young adults are most often attacked, it occurs not infrequently in camps, or in other groups of closely associated individuals. The sporadic form is always more or less present in most cities, and so-called "basillar meningitis" is doubtless generally this disease. Some epidemics in cities show a large number of very young children affected by it. Epidemics appear, both in this country and in Europe, most frequently in the winter and spring months, and the greatest number of sporadic as well as epidemic cases occur during March, April and May.

The cause of epidemic cerebrospinal meningitis is the *Diplococcus intracellularis meningitidis*, also called meningococcus, which was first described by Weichselbaum, in 1887. These cocci are found in the spinal fluid. In appearance they are very much like gonococci, and lie in pairs either in or near the leukocytes. These germs are also found in the secretions of the nose and nasopharynx. The meningococcus is of low vitality and is readily killed by sunshine, drying and by freezing; therefore, with ordinary precautions the danger of contagion is slight. As in so many other diseases, carriers of this germ have been found, and they probably play a considerable part in the spread of epidemics and in the occurrence of sporadic cases.

From these facts meningococcus cerebrospinal meningitis should be made a reportable disease, whether occurring in sporadic or epidemic form, and carriers should be sought, and when discovered, isolated and treated.

In the first place, it may be mentioned that rarely it has been noted that the disease has attacked an individual more than once. In the second place, carriers have become more or less immune, but it is

If-evident that, having been discovered, although

close contact is needed, and though the germ is not sturdy and is readily killed after leaving the body, they must be isolated and treated. Therefore, the persons immediately surrounding a case of meningococcic meningitis should have the secretions of the nose and nasopharynx examined for this germ. It has not been shown just what local treatment of the nose and throat of these individuals is advisable, but antiseptic sprays, swabbings and gargles are certainly indicated.

Vaccinations, with dead meningococci, of children who have been directly exposed to the disease, and of the nurse or other persons, who must care for cerebrospinal fever patients would seem to be advisable in preventing the spread of the disease. It has been suggested that a moderate amount of immunity would be sufficient to prevent this particular infection. How long immunity would last is not known. Vaccination with this germ causes a febrile reaction, with leukocytosis. Meningococcus vaccines are now prepared, and can be readily obtained. Sophian and Black have discussed this subject. Meningococcic vaccine has been injected, and antimeningococcic serum has been sprayed into the noses and throats of carriers, with some success. It has not been shown how constantly this treatment is successful.

TREATMENT

Flexner has given us a specific treatment, and the method to be followed in its administration cannot be better described than by once more referring to Du Bois and Neal.

If the fluid taken from the spinal canal is cloudy, they immediately inject antimeningitis serum, warmed to the body temperature, and injected slowly. They consider a syringe as dangerous, and adopt Koplik's gravity method. They state, in general, that the dose for an adult is from 20 to 40 c.c., and for infants and children from 3 to 20 c.c., the amount largely depending on the quantity of fluid withdrawn, and the dose should usually be from 5 to 10 c.c. less than the amount of fluid withdrawn. They state that occasionally in true meningococcic meningitis they have obtained no fluid from the canal in spinal puncture, so-called dry tap. In such cases they have injected a small amount

of the antiserum, with careful watching of the patient to note changes in pressure as determined by the character of the pulse and respiration. In severe cases they inject the antiserum every twelve hours until there is improvement. In moderate and mild cases they usually repeat the injection once a day for four days. The bacteriologic findings of the fluid withdrawn at the last injection, and the condition of the patient, determines whether the antiserum should be given longer. They state that usually from four to six injections are necessary, but they have given sixteen or more. On successive punctures and injections the patient is turned first on one side and then on the other, which they think insures the emptying of the lateral ventricles in rotation. In other words, a patient who lies on his right side for one puncture will be placed on his left for the next.

A number of times they have seen the patient go immediately into a condition of shock after the injection of the serum, with the respiration shallow, the face pale, and the pulse rapid and thready. They have never, however, seen a patient die in this condition, and if the needle is still in place they withdraw some of the serum. Artificial respiration is resorted to if the breathing has ceased, and hypodermic stimulation of the heart is given. This condition of shock does not occur frequently with the smaller doses that are now administered. The serum they have lately used contains 0.2 per cent. of trikresol, and as they have used trikresol serum over five hundred times in patients of all ages, they do not believe that fatalities are due to the phenol contained. However, on account of objection having been made to trikresol, they are ready to try chloroform as a preservative.

Barnes states that antimeningococcus serum differs from ordinary antisera in that it is destructive to the meningococci, and at the same time neutralizes the endotoxins set free during the destruction of the germs.

If a case of cerebrospinal fever shows a tendency to become chronic, Du Bois and Neal make an autogenous vaccine and give it every four or five days, "in doses from 250 to 1,000 million" bacteria. They are not

convinced of the value of this treatment, but they have not seen it do any harm.

The general treatment of cerebrospinal fever demands the best hygienic surroundings obtainable, and a quiet, cool, darkened room, as in any meningitis. The bowels should be thoroughly moved in the beginning, and then, daily, or every other day, the patient should receive a laxative, if needed.

As the vomiting is reflex, stomach sedatives are of no avail. As the central condition is improved or the patient becomes more stupid, the vomiting will cease. Food in the early stages should not be pushed, as there is great repugnance to it. Plenty of water, and later simple cereal gruels and milk should be the early diet. The subsequent diet should depend on the height of the fever and the ability of the patient to digest. In the stage of convalescence food should be pushed, if it is well digested. Through the acute illness, starches should be given to prevent acidemia. If the pain is sufficient to require sedatives, much food should not be given, as it will not well digest.

A most important symptom of this disease is likely to be pain, and there is no excuse for allowing a patient, because it is a young child, to suffer pain. Morphin or codein represent the most efficient and the safest drugs, the dose, of course, being regulated according to the age of the patient and the effect. Generally it is better to administer a very small dose hypodermically than a large dose by the mouth; the action of the whole dose is obtained, and there is no doubt as to whether or not it is absorbed. Ergot given in aseptic form, intramuscularly, not only seems to act as a sedative to the nervous system and possibly diminishes congestion, but it certainly prolongs the action of any dose of a narcotic. Less morphin, codein or other narcotic will be required to stop pain and cause rest if ergot is coincidentally given. If the blood pressure is low, this is another indication for the administration of ergot. Generally, if the blood pressure is high, ergot should not be given.

Local applications of cold and ice to the head (the hair being cut short) and to the spine, may inhibit the inflammation, and sometimes seem to be of great value. At other times these cold applications seem to increase

the pain. This seems to be especially true if the temperature is low. Exactly what these cold applications do to the blood vessels of the parts inflamed is a question that has not been determined. Cold sponging of the body is hardly advisable, as it tends to increase the internal congestion. Theoretically, it would seem more sensible, and practically it is often better to use hot applications, as hot sponging, and even hot baths have been advised, for very young children, to relieve the congestion of the central nervous system.

Painful joints may be wrapped in cotton and kept warm, much as is done in rheumatism. Conjunctivitis should be treated with a simple boric acid wash. The throat and nose should be cleansed with simple saline sprays or mild antiseptic gargles.

There would seem to be no excuse for the administration of quinin, strychnin, caffeine, or any other cerebral stimulant. It would also seem inadvisable to administer alcohol in any form. If the blood pressure is high, hot sponging, small doses of nitroglycerin and more brisk catharsis are indicated.

The patient should remain in bed for at least a week after the cessation of the fever, and convalescence should be slow, and the return to activity should be delayed. During convalescence it is well to administer small doses of sodium iodid, as iodid seems to be efficient in aiding the absorption of exudates. Iron and other tonics may be indicated.

Stiffening of the muscles and joints may require massage, and, if there are any adhesions in the joints, the orthopedist should be consulted as to whether passive movements or forcible breaking up of these adhesions under an anesthetic is advisable.

The frequency with which mental deterioration occurs can only be determined by a long careful study of many cases. Cerebral degenerations and disturbances may develop after many years and yet apparently have been caused by this disease.

The various complications that may occur have already been mentioned, and their treatment would be that usual for the localized inflammation modified by the general condition of the patient from the cerebro-spinal fever.

ACUTE ANTERIOR POLIOMYELITIS

It was not definitely shown, until 1909, that this disease belonged to the infections and was contagious, although it had been long suspected.

PREVENTION

It is quite probable that the so-called "distemper" which at times attacks dogs and may attack horses, is really caused by this same infection. Hence, a dog affected with distemper should be isolated, and no child should be allowed to associate with it. While it has not been shown that flies will carry this disease, in all probability they may transmit the infection by their feet. Consequently, flies should be excluded by proper screens, if possible, from any animal that suffers from distemper, and certainly should be prevented from reaching an individual sick with poliomyelitis.

As early as Feb. 12, 1910, Flexner and Lewis showed that this disease was contagious by means of the secretions of the mucous membrane of the nose especially, and also of the throat, and therefore that every patient should be isolated, and that the disease should be made reportable to the boards of health.

The nurse and the family should understand that the same care must be exercised in destroying the contagium and preventing the contamination of articles and substances by the secretions of the nose and throat of a poliomyelitis patient as is so well understood must be taken in diphtheria.

As soon as a case is reported to the board of health, the school board should be informed (as such cases are frequently in children too young to go to school) that they may send home from school the other children of the family, and if there is an epidemic, perhaps the other children of that tenement. The incubation period is said to vary, and may be as long as ten days, but to be safe from causing infections in others, such children should remain out of school for two weeks.

TREATMENT

A. The Acute Stage.—The same care in isolation, and of the secretions of the nose and throat, to pre-

vent possible infection of others or contamination of articles, should be carried out as has been described for the other infectious diseases. Flies and all domestic animals must positively be excluded from the sick-room. As soon as the diagnosis is positive, the disease should be reported to the board of health, whether or not it is a reportable disease in the community.

As Flexner states that the virus is eliminated by the intestines as well as by the nose and throat, all movements of the bowels during the course of the disease, and perhaps for some little time after the acute stage is over, should be as thoroughly disinfected as they are in typhoid fever. It cannot yet be decided just how long quarantine should be continued, but two weeks should be the under limit, and better, three weeks. That more of the attendants or associates of a patient sick with poliomyelitis do not contract the disease may be because they are insusceptible, or they may have become immune from some previous abortive attack.

When the disease has started, there is no known medical method of aborting it, although mild infections may abort without paralysis. Netter makes intraspinal injections of the serum from persons who have had poliomyelitis at some time in the past assuming that the serum contains antibodies which will have a therapeutic action. In one case given ten injections of serum in eleven days, in a dosage of 5-7 c.c., a beginning paralysis was halted.

The treatment in this stage of the disease is to relieve cerebral and spinal congestion and remove all possible toxins that may be absorbed from the intestinal canal by free but gentle catharsis. Calomel, in one sufficient dose, associated with cascara, aloin or rhubarb, as deemed advisable, is always a good method of treatment. Castor oil is another, or at times a quickly acting saline cathartic may be advisable. Subsequently the bowels should be moved as frequently as the diet and the condition of the intestines seem to require. A child that is not taking much food for the first two or three days after the first cleaning out of the intestines need not necessarily be bothered with a laxative every day during this first stage of the dis-

ease. As soon as paralysis begins, it may be difficult to cause the bowels to move, and a simple glycerin suppository or a small enema may be needed.

The child must not be allowed to forget to urinate, as some loss of normal bladder irritability may allow urine to be retained and distention of the bladder to occur. Therefore, the child should be encouraged to urinate at about four-hour intervals. Of course, if the urine cannot be passed, it must be drawn.

Generally the fever is not high. If it is high, two or three small doses of acetanilid may be administered or sponging the body with warm water is advisable. General cold sponging or general cold applications are inadvisable, as tending to cause increased congestion of the central nervous system. The value of an ice cap as a reducer of temperature is doubtful, and it is likely to cause the child to become more restless. The value of a spinal ice bag is also doubtful, as many times these cold applications cause an increase of pain.

Pain must be stopped in a child as well as in an adult; this fact is often forgotten. The physician allows a child to suffer because he dislikes to give strong narcotics, when an adult would demand something to stop his pain. If there is high fever and a few doses of acetanilid have been given, this may prevent some of the pain, but pain is most safely combated by small doses of morphin, codein, or opium in some form. Perhaps there is no better method of giving this narcotic drug to a child than by means of the deodorized tincture of opium. The dose may be, even to a young child, one drop every hour until the child is sleeping or is quiet. If the child is very young, of course the dose should be less, and for a child 10 years of age the dose should be larger. If the brain is so affected that the child is stupid, pain is not much felt, and narcotics will not be needed. Unless the child is excessively nervous, restless, sleepless, and twitching and jerking about the bed, such cerebrospinal depressants as chloral and bromid are not indicated, as one can but feel they might tend to increase the muscle debility and paralysis that must follow the acute stage of the disease. It seems safer and more rational to give for this condition opium or one of its alkaloids in a dose sufficient to cause quiet and rest.

In this disease, as in all forms of meningitis, the bedroom should be quiet and removed as far as possible from all noise and disturbance. The child should not be unnecessarily spoken to, and there should be frequent darkening of the room in order that the patient may get all the rest possible.

During the active stage food should not be pushed. Part of the diet should be milk, and the rest of it should be cereal gruels. The diet should not be wholly milk, for in this as in all acute diseases the possibility of acidemic conditions occurring should not be forgotten, and starches should always be given in the form most acceptable to the patient. The first day or two the child will be thirsty, and should be allowed all the water it desires. As soon as the fever diminishes or ceases, nutrition should be pushed, and the child should be encouraged to eat so that the general strength may be recovered as rapidly as possible. If at this time the tongue is coated, the digestion poor and the appetite insufficient, it may be because gastric acidity is insufficient, and a few drops (not more than five) of dilute hydrochloric acid, in water, after meals, may aid in overcoming these conditions. Or perhaps still better is the tincture of iron chlorid in a dose of not more than three or four drops, in a little fresh lemonade or orangeade.

B. Local Treatment. — Fixation of the painful extremities and of the back, in the most restful position, with the aid of cushions and pillows, is important during the acute stage. As there is no special inflammation in any joint or muscle, cold or ice to a painful region is not indicated. Dry warmth may cause a lessening of the pain and is often of value. If the limbs affected become cold from disturbed circulation, they should be surrounded with cotton or covered with flannel. Restriction by bandages is inadvisable.

During the first stages of the paralysis great care must be taken in watching the position of the limbs, especially the legs, to prevent contractions caused by the pulling of the unaffected muscles. Massage is soon valuable, but must be very gentle. Proper massage will not only increase the nutrition of the affected muscles, but cause relaxation of spasm of the unf-

fectured muscles. It may be necessary to devise some apparatus to keep the leg or foot from becoming deformed. For this purpose various splints, or wooden or wire troughs properly padded with cotton may be used. Gibney and Wallace urge that the legs should be kept straight or in slight flexion at the knees and in line with the body, while the feet should be kept at right angles with the legs.

The value of having the child, as early as possible, make slight voluntary efforts with the paralyzed muscles is excessively important. All neurologists and orthopedists now believe that one voluntary contraction of a muscle is of very much greater value than many passive activities of a muscle or contractions caused by electricity or other irritant.

Some writers believe that counterirritants applied to the spine, such as cautery treatments, are of value in hastening the stage of resolution of this disease. While they may be of value, consideration must always be given to the disturbance that it will cause the child who has suffered enough pain, and who already has difficulty in finding comfortable positions in bed.

C. Paralysis.—When the circulation is poor in an extremity, the local application of heat in any form, and perhaps by baking, is of value. As soon as it is believed that all active inflammation in the spinal cord has ceased, electricity should be begun, and Jones believes that electricity should not be used until from three to eight weeks from the beginning of the infection. Galvanism should then be used on the nerve trunks, gently and not too strong, while the muscles are caused to contract by faradism as long as they react to that current. If they do not react to the faradic current, the galvanic current should be used to cause contraction by making and breaking. The rapidity of the making and breaking galvanic current should not be too great, nor should any kind of muscle stimulation be continued too long at any one sitting; in fact, at first only a few contractions should be caused.

Voluntary training directed by a skilled orthopedist, and the application of any splints or apparatus that

may be necessary to prevent deformities and atrophies should soon be inaugurated, as Taylor and many others believe that massage and electricity are very ineffective in causing recovery of muscles paralyzed by poliomyelitis. All physicians and surgeons urge that the greatest improvement is caused by plenty of rest in bed, graded exercise, warm baths, good food and fresh air. In other words, the better the nutrition the greater the improvement in the paralyzed muscles. Muscles may even recover after a year or more of paralysis when treated by a skilled orthopedist. It should be emphasized that rough, harsh massage and misdirected use of electricity may do serious harm to the paralyzed and contracted muscles. In a word, the general practitioner should as quickly seek the aid of the orthopedist in treating the paralysis of this disease as he would seek a skilled aurist in an internal or middle-ear inflammation.

Surgical repair of deformities that cannot be corrected by apparatus or muscle training has now reached a stage never equaled before, and tendon transplantation and other orthopedic operative measures cannot too soon be considered when improvement ceases to occur in a limb affected with paralysis from poliomyelitis. A recent discussion of this subject is presented by Moore of Philadelphia.

HOOKWORM DISEASE

This disease is found in all tropical and southern temperate zones; in the United States southward from the Potomac River latitude through to the Pacific coast. The symptoms are laziness, lassitude, weakness, loss of physical and mental ability and vitality, loss of weight and anemia. Children do not properly grow and adults become shiftless, incompetent, and poverty stricken, and they, with their families, become a tax on the community. Hence hookworm eradication is an economic question.

The hookworm was discovered in Porto Rico by Major Ashford, Surgeon of the United States Army, but to Dr. C. W. Stiles of the United States Public Health Service belongs the honor of having found the worm in the southern states and of having shown that it differs generically from the Old World worm,

but that it causes the same symptoms. The American type of worm is called *Necator americanus*.

The disease can be discovered by giving the specific treatment in a suspected case and then sifting or washing the stools through cheese cloth, when worms will be found, if present.

The treatment is to give little or no supper, and at bedtime a dose of magnesium sulphate. In the morning, as soon as the bowels have moved freely, one-half the dose of thymol, in capsules, is given, and in two hours the remainder of the thymol. Two hours later another dose of magnesium sulphate is administered. After movements of the bowels from this dose food may be taken, but only coffee or tea, without milk, should be allowed during the period of the treatment, namely, until the thymol has supposedly all passed out of the body. Absorption of thymol is not desired, as it may cause unpleasant symptoms. Alcohol and oils should not be given either before, during or even soon after the treatment. For one hour after taking the thymol the patient should lie on his right side to hasten the passage of the drug and liquid through the pylorus into the intestines.

The dose of thymol depends on the age, but is large. Ferrell suggests 4 gm. (60 grains) for an adult dose (that is, from 20 years of age upward). Doses for children and youth may be readily estimated by the following formula, namely: At 15 years, $\frac{3}{4}$ of the age, $\frac{3}{4}$ of the adult dose; at 10 years, $\frac{1}{2}$ the age, $\frac{1}{2}$ the dose; at 5 years, $\frac{1}{4}$ the age, $\frac{1}{4}$ the dose; at $2\frac{1}{2}$ years, $\frac{1}{8}$ of the age, $\frac{1}{8}$ of the dose. If the patient is much underweight for his age, the dose should be reduced accordingly. The thymol should be powdered and placed dry in capsules. One-half the dose decided on is given at 6 a. m. If the bowels have been well moved from the dose of magnesium sulphate the night before, the other half of the dose of thymol should be given at 8 a. m., both doses being taken with plenty of water. Ferrel adds sugar of milk in equal parts to the thymol, and says he thinks the drug acts better.

In one or two weeks the treatment should be repeated, unless the microscope shows the feces to be free from the parasite and its eggs. Sometimes a

third and even a fourth treatment may be needed. The action of the thymol may be hastened by (at the moment of swallowing) uncapping the capsules.

Thymol when absorbed acts like phenol, but it is slowly dissolved by the gastro-intestinal fluids and hence, is absorbed slowly. Any oil or fatty substance hastens its absorption. Convulsions are probably not often caused by thymol poisoning, but great weakness and finally collapse are the gross subjective symptoms. Objective symptoms of its undesired absorption are albumin and even blood in the urine. Fatty degeneration of the liver and congestion of the kidneys and lungs are pathologic findings.

To forestall any possible great absorption of thymol after large doses are administered in hookworm disease, a brisk cathartic (Epsom, Glauber's, or Rochelle salt) should be given and repeated, if free catharsis does not occur within a few hours after taking the thymol. Castor oil, or any other oil, should of course not be the cathartic used. If symptoms of poisoning occur, stomach-washing, colon-washing, and sodium sulphate or potassium and sodium tartrate should be the means used to promote elimination. Strong black coffee should be given, and hypodermic injections of atropin, strychnin, and pituitary extract should be administered and the patient should be surrounded by dry heat. Later, any kidney congestion should be treated as an acute nephritis.

Except as a specific for hookworm, thymol should probably never be used internally. As a bowel anti-septic it is too dangerous a drug to be used repeatedly, unless the dose is too small to be of any value.

Ferrell's dosage for adults for hookworm disease is as follows:

| | |
|-------------------------|--------------|
| | Gm. |
| R Thymolis | 4\| or gr. 1x |
| Fac capsulas siccas 10. | |

Sig.: Take 5 capsules, with plenty of water, in the early morning, as soon as the bowels have moved. Take the other 5 capsules in two hours. Two hours later take $\frac{1}{2}$ ounce of Epsom salt, which should be repeated if it does not act in four hours.

Owing to a possible scarcity of thymol it is important to note that investigations of the United States

Public Health Service have shown that oil of chenopodium (American wormseed oil) is efficient in this disease. (Public Health Reports, reprint No. 224, Oct. 2, 1914, by M. G. Motter.)

Wormseed oil seems to paralyze or stupefy rather than kill the hookworm; therefore it is very essential that soon after such action has occurred, a cathartic should be administered to cause evacuation of the worms before they can recover their vitality. Unlike male fern and thymol, castor oil may be administered with this drug. It will be remembered that any oil is likely to cause a dangerous amount of male fern and thymol to be absorbed. This is not true of wormseed oil.

The doses of oil of chenopodium suggested in this pamphlet are about 1 drop for every year of age up to fifteen. The drug is well administered in a teaspoonful of granulated sugar, every two hours, for three doses. Two hours later, a child of ten years, for instance, should receive a tablespoonful of castor oil with one-half a teaspoonful of spirits of chloroform. The dose of the castor oil and of the chloroform should vary according to the age of the patient.

Possible undesired symptoms from wormseed oil are drowsiness and depression. Such symptoms occurring, rapid purging should be caused by a saline cathartic, and such stimulants as hot coffee or caffeine should be given. The pamphlet suggests hot coffee by the rectum, but while purging is going on, this would hardly seem worth while.

The results with wormseed oil treatment in America have been corroborated in a large series of cases reported by Heiser from the Philippines.

TYPHOID FEVER

GENERAL PROPHYLAXIS OF TYPHOID FEVER

Typhoid fever is one of the most preventable of all infectious diseases. The essential agent in the causation of typhoid fever, *Bacillus typhosus*, has been found in the blood, in the feces, in the urine, and in the bile. It cannot always be discovered in the early days of the disease, but in the second or third week it can generally be detected. It may persist for years

even as many as twenty-five or fifty, after a patient has become convalescent, and also in the body, particularly in the feces and urine of individuals who have never themselves, so far as can be determined, suffered from an attack of the disease. These individuals are known as "typhoid carriers."

After diagnosing the disease as typhoid, the physician should at once report the case to the health office. Even should the case be suspicious only of typhoid, the following precautions may well be taken. The feces immediately on being passed should be covered with a 5 per cent. solution of phenol, and the hard masses should be broken up so that the disinfectant will thoroughly penetrate the fecal matter and come in contact with all microorganisms which may exist therein. Other disinfectants may be used, such as chlorinated lime, or liquor cresolis compound, 2 per cent. The utmost cleanliness should be used by the attendants in connection with the movements of the bowels. The skin surrounding the anus should be carefully washed with a disinfectant solution, and the cloths used for this purpose should be put in paper bags and subsequently burned. The attendant also should, after bathing the patient, always wash her hands in a disinfectant solution. In a similar manner the urine should be discharged into a vessel and mixed with a disinfectant solution.

The bacilli can sometimes be found in the sputum, and if the patient has any cough, the sputum should be collected on cloths and burned.

All bedding should be soaked in a disinfectant solution and boiled before being washed. The cups, glasses, dishes, knives, forks, spoons, and napkins used by the patient should also be disinfected before being washed.

During convalescence, the feces and the urine should be subjected at intervals to bacteriologic examination, to determine whether the bacilli are still present. It has been found that they may be absent at one time, and may reappear later, so that repeated examinations are necessary. The patient should be carefully isolated until repeated examinations have shown entire absence of bacilli, both from the feces and the urine. When these rules have been observed

in the care of any patient suffering from typhoid, he, his friends, and the physician, will rest assured that there will be very little likelihood of his communicating the disease to anyone else directly or indirectly.

As has been stated, the disease may be carried directly from the patient suffering from the disease, or from a so-called bacillus-carrier. The bacilli may be received directly by a person who does not possess immunity to the disease by handling articles, such as clothing or utensils used in eating, which have been contaminated by fecal matter, urine, or sputum from a typhoid patient. A far more common mode of infection is the indirect method, which embraces infection through water and through various food supplies, especially milk and oysters. Many epidemics have been due to the infection of a water-supply from patients suffering with typhoid.

Jordan (*Jour A. M. A.*, June 6, 1914, p. 1772) states the following rules, for the individual and the community in preventing typhoid:

RULES FOR PREVENTING TYPHOID FEVER

For the Individual:

1. Keep away from all known or suspected cases of typhoid.
2. Wash hands thoroughly before meals. Do not use "roller towels."
3. Use drinking-water only from sources known to be pure, or if this is not possible, use water that has been purified by municipal filtration or by hypochlorite treatment or by boiling in the household.
4. Avoid bathing in polluted water.
5. Used pasteurized or boiled, instead of raw, milk.
6. Select and clean vegetables and berries, that are to be eaten raw, with the greatest care.
7. Avoid eating "fat" raw oysters and, in general, oysters and other shell-fish whose origin is not known.
8. Be vaccinated against typhoid in all cases in which any special exposure is known or feared.

For the Community:

1. Insist on the hearty cooperation of all persons with an efficient health officer.
2. Require notification and a reasonable degree of isolation of every known or suspected typhoid case.

3. Exercise strict control over the disinfection of known typhoid excreta.

4. Insist on pure or purified water-supplies.

5. Require pasteurization of milk-supplies.

6. Regard all human excreta as possibly dangerous, and control their disposition in such a way as to prevent contamination of food or drink.

VACCINATION AGAINST TYPHOID FEVER

In 1893, Fränkel first published his observations on the inoculation treatment of typhoid fever. In 1896, Wright published his first article on antityphoid inoculation. The British first introduced inoculation in the Indian army for the prevention of typhoid fever and demonstrated that the individual was protected by such inoculation for two and one-half years, and partially immunized for five years. In 1900, inoculation prevention was used by Germany, also, in her armies, and German and English military camps soon became almost free from typhoid fever by such protective vaccination. With the inauguration of this measure in the United States Army, typhoid fever became greatly diminished in frequency. Vaccination of our army was begun in 1909, and, in 1911, among 80,000 men only 11 cases of typhoid fever occurred, with one death. In 1912 there were 15 cases in the army, with 2 deaths. This shows that occasionally the typhoid inoculation does not protect, but the improvement shown by the diminution in the number of typhoid cases from 9.43 cases out of every thousand soldiers in 1901, to 0.26 for every thousand soldiers, in 1912, compels belief in its efficiency. The death-rate from this disease decreased, per thousand soldiers from 0.64 in 1901 to 0.03 in 1912.

The incubation period of typhoid fever is about two weeks. Its duration, when there are no relapses, is about two months. This means two weeks of incubation, four weeks of more or less serious illness, and two weeks before the real convalescence. Young adults and youth are most likely to contract this disease, although it may occur at any age. This is the age, then, for the greatest effort to be made to give protective inoculations. All nurses and members of

hospital staffs; students of colleges and seminaries; employees, and those who are interned in work houses, jails, prisons and asylums; men in lumber camps; and all those who travel and are therefore subjected to varying water, milk and food-supplies, such as "traveling" men, engineers, seamen, tourists, and vacationists, should receive typhoid preventive vaccination.

With all the advantages to an individual and to a community conferred by protection against typhoid fever by vaccination, the physician must also carefully consider what constitutes contra-indications. It seems to be wise carefully to examine every individual to ascertain his condition of health before vaccination is done. It should not be done if he is suffering from any acute infection however simple, namely, a coryza, a pharyngitis, a tonsillitis, or any acute gastro-intestinal disturbance, gonorrhea, syphilis, albuminuria, glycosuria, or the more serious conditions of chronic nephritis or diabetes. The injections should be made in the afternoon, and the active symptoms will generally be gone by noon of the next day. Three injections should be given at weekly intervals.

The method of injection is as follows: Paint with tincture of iodine an area about 15 mm. in diameter at the insertion of the deltoid muscle. Inject subcutaneously with sterile needles and the best vaccine the dose of killed bacteria decided on. Then paint the region with collodion and allow it to dry. If proper care is taken, no infection will occur, and, as above stated, a temperature reaction is rarely above 100 F., and perhaps never reaches as much as 102 F., even in exceptional instances. A severe reaction could only occur when there is some serious complication in the individual, as perhaps tuberculosis. All slight reactions are generally over in twelve hours and even severe ones are generally over in twenty-four hours.

The local reaction is greatest after the first dose, less after the second, and least after the third. Typically, there is an acutely inflamed area, varying in size, not hard and indurated like an incipient abscess. The arm may ache, and the axillary glands may become tender. The local reaction is generally at its height in about ten hours, and generally nearly

gone in twenty-four hours. Any more severe reaction would be due to contamination.

The dosage for children should be based on the child's weight and not on its age. The recommended adult dose is based on a weight of 150 pounds. It seems to be necessary for continued protection to revaccinate children more frequently than adults, namely, in about three years.

TREATMENT OF TYPHOID FEVER

A. General Measures.—Needless to state, the patient with typhoid fever should be put to bed and kept quiet. The usual measures such as the use of a cleansing cathartic should be instituted and simple fluid mixtures such as lemonade or citrate solution may be given. Patients should be encouraged to shift the position in bed sufficiently often to prevent the occurrence of congestion of any of the viscera or the appearance of bed-sores. The hygiene of the mouth should be watched, as mentioned for other diseases, with scrupulous care.

B. Diet.—Whether we have underfed our typhoid patients or overfed them, it seems that the evidence is very strong that milk alone is not the proper food for these patients. In fact, when we consider the frequent difficulty in its digestion, the large amount of it that must be given to satisfy the system either in calories or in protein, it would seem that we should rule against it as a typhoid diet. These facts immediately cause the decision that our old feeding of typhoid fever was wrong, and that we must select a new or modified food in this disease.

It can not be questioned that the high temperature, rapid pulse, delirium, and that association of nervous symptoms called typhoid are not caused by the typhoid germ alone, but by a double infection, and the double or secondary infection is due to toxins or the products of secondary germs absorbed from the intestines.

Tympanites is an indication not of typhoid fever, but of intestinal putrefaction and fermentation, and a mistake in the management of the bowels and of the food administered.

It stands to reason, then, that primarily such food and arrangement of the movements of the bowels as cause the least tympanites and the least indigestion are of first importance in the management of typhoid fever. Secondly, the food which, so far as possible, satisfies the requirements of the body for nutrition and at the same time satisfies the above requirements of easy and thorough digestion, should be the food of choice.

Barker (*Journal A. M. A.*, Sept. 12, 1914, p. 929) suggests the use of a high caloric diet which has been shown by Coleman, DuBois and others to be theoretically adequate and practical. The amount of food necessary to meet the needs in typhoid fever is large. The carbohydrate intake is most important; when not contra-indicated for some special reason, it should make up, Coleman thinks, a half of the calories given. Fat seems to be better borne in the amphibolous period and during convalescence than in the earlier stages of the disease.

Protein may be taken in sufficient amounts as eggs and milk. Schottmüller and other German writers give as much as 100 gm. of scraped meat per day, but in American clinics meat is rarely given, as it seems often to excite digestive disturbances and to increase renal irritation. Meat soups are also avoided, though a little broth or consommé may be given to improve the appetite and to stimulate the secretion of the gastric juice. If soup be given, it is well to add eggs and cereal to it to increase the caloric value. Eggs may be taken raw, or beaten up with milk, or as soft-boiled or coddled eggs. From four to eight eggs may often be given in twenty-four hours.

The carbohydrate may be given partly as milk, partly as bread or toast (with butter), and partly as lactose added to the milk, cereals and orange-albumin. Coarse cereals with cellulose residue are to be avoided. Dry toast of zweibach buttered, if thoroughly chewed by the patient, may be used without harm. Boiled rice and mashed potatoes may be given as variety. Lactose is a very important article of the diet. It is easily soluble, is not very sweet, and can be given in large amounts without the appearance of sugar in the urine.

A liberal amount of fat in the diet will send the calories up, but not all patients bear fat well, especially early in the disease. Fat may be tried in the form of cream, of butter and of yolk of egg. Coleman has been able to give as much as 200 or 250 gm. of fat per day without causing digestive disturbances. The fat content of ordinary milk is of course considerable, and milk in amounts of from 1.5 to 2 liters per day can be given to most patients without difficulty. Some patients, however, are intolerant of milk even when modified by peptonization, or by mixing with lime-water or with sodium citrate. Some patients take fermented milks very well, but the objection to them lies in the reduction of the carbohydrate content by the fermentation.

Fruit juices, to which lactose has been added, may be given, as long as there is no diarrhea, but they should be discontinued should diarrhea develop. It must be remembered, however, that patients on the high-calory diet ordinarily have from two to four stools a day.

It should be continually borne in mind that individual patients may not thrive under such a high-calory diet. Should tympanites or other digestive disturbances begin to appear, it is well to modify the diet at once and especially to restrict the intake of milk and of lactose. If, on the high-calory diet, examination of the stools shows that undigested food is passing through, the diet should be reduced.

A good mixed diet for twenty-four hours, suitable for an ordinary adult ill with typhoid fever, is represented by one pint of milk; two eggs, or the whites of three eggs; one cup of thoroughly cooked, thin oatmeal gruel; the juice expressed from a pound of chopped round steak; a small cup of coffee, in the morning; a small portion of wine, orange, or lemon jelly made from gelatin; and enough salt and sugar in the above to make them palatable.

The milk may be administered, hot or cold, with or without salt, with or without Vichy, with or without lime water, in two or three doses, as deemed best in the individual instance. Sometimes koumys makes a valuable substitute for ordinary milk. Sometimes buttermilk may be used, and this in larger quantities.

The eggs may be given raw, beat up with a little milk, or given with lemon juice on cracked ice, may be poached, or, if the temperature is not high, soft boiled or in the form of boiled custard.

The oatmeal gruel should generally be made with milk, and thoroughly cooked, strained, and salted to suit the taste.

Meat juice is best prepared by just covering the chopped steak with water, and allowing it to stand for an hour and a half. The water and juices are then expressed out of the meat. This watery extract will then contain, besides the blood of the meat, actual muscle serum, which is a decided tonic, especially to the heart. This expressed fluid is then kept on the ice and administered, properly salted, in two or three doses. If the patient is not too ill, the food may be made more agreeable by allowing the patient to chew the meat, but not swallow the fibrous portion.

While gelatin is generally pleasant to most patients, it also has some nutritive value, and possibly tends to aid normal coagulation of the blood, and perhaps prevent capillary bleedings from the inflamed intestines.

A patient who is accustomed to his morning coffee need not be deprived of that pleasure because he has typhoid fever, unless there are meningeal symptoms, or meningitis is actually present.

Experience seems to teach that it is best to administer nutriment to the typhoid patient in small amounts at three-hour intervals. It should, however, be arranged that the patient has normal rest. In other words, he should not be awakened from a comfortable sleep because it is time to do something to him or for him, and at regular three-hour feeding intervals should be the periods at which he is to be disturbed for other treatments. During the night, if he is not seriously ill, he should not be disturbed as often as every three hours.

With the treatment outlined, and with proper care of the mouth, the patient's tongue is rarely badly coated and should be moist, there should be no nausea, and there should be no tympanites.

C. Colon Enemas.—It has been lately shown that fecal deposits, seeds or other food debris may become lodged in the lower corner of the ascending colon, the

cecum, and may cause inflammation or symptoms of appendicitis, and may even be a subsequent cause of appendicitis. Hence it may be found to be good treatment, in the first few days of typhoid fever, to give colon enemas of from one to two quarts of warm water, the patient lying on his right side, to aid in washing away the possible accumulations in the cecal region. Such colon washings can certainly do no harm in the first days of typhoid, and may be of marked benefit in the future course of the disease. In other words, the more thoroughly the pathologic process in the intestines, in typhoid fever, is considered from a surgical standpoint, with the aim to keep these ulcers and the inflamed intestinal mucosa as clean as possible, the less will there be secondary infection, the less will there be tympanites, the less will there be deep ulcerations, hemorrhages and perforations, the less high the fever, and the better the whole prognosis.

D. The Fever.—Hydrotherapeutic measures have become so universal in the treatment of the fever in typhoid patients that it is unnecessary to describe these measures in detail. The nerve stimulus due to the cold and the sedative effects of the bath are among the important effects it is desired to achieve. These results may be secured not only by actual tubbing but by sponging, packing, etc.

Among the contra-indications to tubbing may be mentioned otitis media, hemorrhage, collapse, meningismus, etc.

E. Medical Treatment.—Not only should the bowels be cleared at first, but subsequently the bowels should be moved daily. This is best done by administering every other day some gently acting saline laxative, which cleans the upper part of the intestines, tends to drain the portal circulation, to keep the liver, our Pasteur filter, in a healthy condition, and to cause an easy watery movement. Any tendency to a diarrheal condition or to too many movements from such a laxative may be stopped by the administration of 1/10 grain of morphin. The bowels are thus cleaned and subsequent excessive peristalsis inhibited, and the patient is generally at rest for the remainder of the day. On the alternate day a small glycerin enema,

administered with a glass syringe, consisting of a tablespoonful of glycerin and a tablespoonful of water, will cause within ten minutes a movement of the bowels that will at least empty the descending colon and cause the expulsion of gas. Such management of the bowels seems contra-indicated only by intestinal hemorrhage, signs of perforation and great prostration. Such treatment also prevents secondary infections that keep the temperature high. In other words, less antipyretic measures are needed, if the abdomen is flat, tympanites is not present, and the patient's bowels have moved daily artificially, and the movements are not caused by diarrhea due to irritation from the disease.

The best antiseptic to the upper part of the intestines seems to be salicylic acid in some form, and one of the best forms is the combination with phenol, viz., phenyl salicylate (salol), which may be given in capsules without any disturbance of the stomach, as it is there undissolved and breaks up into its component parts of salicylic acid and phenol in the duodenum. A small dose of this drug (0.25 gram or 4 grains) every six hours may be given continuously through the disease, unless there is a diminished excretion of urine, or albuminuria develops, or the urine shows darkening from the phenol, which would be very rare from this sized dose. Even the non-believers in bowel antiseptics must admit that whether the colon bacilli or typhoid bacilli come to the upper part of the intestine by migration, or reach these regions through the blood stream, it would not be so healthy for them provided salicylic acid was present in the upper intestine as though it were not present.

How good a bowel antiseptic hexamethylenamin (urotropin) is has not been determined, but in post-typhoid conditions when typhoid bacilli or colon bacilli may be present in the pelvis of the kidney or may be present in the gall-bladder, it has been shown that administration of hexamethylenamin is the best treatment to prevent their remaining permanently and causing inflammation in these regions.

Thus far sour milk treatments, lactic acid germs and the administration of yeast have not been mentioned. Certainly bowel infections of most kinds are made bet-

ter by the administration of yeast. The value of sour milk treatments in typhoid fever must be determined by experience. A patient, however, who is not doing well on the diet above suggested should be put on the sour milk treatment. One of the principle objections to such treatment is that the patient's stomach soon objects to any one diet that is to be long continued, although for a few days he might accept the soured milk. On the other hand, most patients do not object to the sour drink produced either by a tablespoonful of upper brewer's yeast in a glass of water, or by the solution of a five-eighths inch cube of a compressed yeast cake in a glass of water, given two or three times a day.

F. Vaccine Therapy.—It is difficult to arrive at a just estimate of the value of vaccines in the treatment of typhoid fever, because the evidence for and against their use is derived from two widely different sources. From a theoretical standpoint, such a procedure has little justification. It is well known that there is an extensive invasion of the blood by the infecting organism early in the course of the disease, and it seems reasonable to assume that these invading organisms furnish sufficient antigenic stimulus to cause the maximum antibody formation. On the other hand, if this antibody formation is delayed early in the course of the infection, vaccines may be of value in stimulating such a response. In the field of clinical medicine, many observers have reported striking results from the use of vaccines, and it is the common opinion of these clinicians that they are efficacious in the treatment of typhoid fever.

The clinical data in the literature pertaining to this phase of the treatment of typhoid fever has recently been reviewed by Krumbhaar and Richardson of Philadelphia. This analysis includes more than 1,800 cases, and in 95 per cent. of these, favorable results were observed. Thirty-five of the thirty-nine observers concluded that the vaccine was useful as a therapeutic measure. In almost all instances, the course of the infection was favorably influenced, and in many series the mortality was reduced. In a series treated

by Petrowitch, the mortality was 3.2 per cent., as compared to 8 per cent. in 220 unvaccinated patients.

Krumbhaar and Richardson (*Am. Jour. Med. Sci.*, 1915, cxlix, p. 406) used vaccines in the treatment of ninety-three typhoid patients in the Pennsylvania Hospital during the past three years. Their results were so promising that they consider the use of vaccines an important procedure in the routine treatment of the disease. The symptoms were rarely altered beyond a transitory rise in temperature; but relapses and complications were diminished in frequency, and when vaccine treatment was instituted early in the course, there seemed to be a favorable influence exerted on the intensity of the infection. Since agglutination is often absent during the first two weeks of the attack, these investigators assume that antibody formation is often delayed, and that by the use of vaccines an early activity of this process can be brought about. The experiments of Gay and Claypole also suggest that there may be a hyperleukocytosis following the injection of a vaccine during the course of typhoid fever. Should these experiments receive confirmation, a good theoretical basis would be afforded for vaccine therapy in typhoid.

The type and dosage of the vaccine have had no apparent influence on the results obtained. Sensitized vaccines have been strongly advocated by Besredka, Metchnikoff, Garbat and others, and on theoretical grounds such vaccines would be favored; but the majority of investigators have had good results with suspensions of dead bacteria prepared according to Wright's method. Although autogenous vaccines generally have been preferred, stock vaccines prepared from organisms selected for their high agglutinogenic power have been efficacious in the hands of many. Reports, however, have been so uniformly favorable with all preparations, that it seems as if the type used is of secondary importance. The dosage has also varied widely with different investigators. Semple, Waters, Petrowitch and others used small doses, while Foster, McArthur, Fletcher and Meakins obtained equally good results with large doses. Krumbhaar and Richardson gave 500 million as an initial dose and

two or three larger doses at short intervals. They conclude that their results were more favorable in the cases in which large doses were given. The dosage, however, must be gaged by the general condition of the patient. When the patient is very toxic, only small amounts of vaccine can be used with any degree of safety.

Ichikawa obtained remarkable results from the intravenous injection of sensitized vaccines. Using this method of inoculation, he was able to produce a rapid drop in the temperature to normal and often an early recovery. In his cases, mild intestinal hemorrhages occurred in a few instances following the injections; but these hemorrhages were no more numerous than in the unvaccinated patients. Subsequent investigators also report favorable results from the intravenous method of administration of the vaccine, but they strongly emphasize the danger of a severe general reaction in some instances. Signs of collapse, severe diarrhea and intestinal hemorrhages are complications which have occurred simultaneously with the rapid fall in temperature, and in a few instances there was an unfavorable termination. The ultimate value of this method of administration of vaccines, therefore, is a question which further observations must determine.

The observations of Elmer (*Jour. A. M. A.*, 1915, lxiv, p. 518) indicate that vaccines will not prevent the attack, once infection has begun. It seems probable that their use early in the course of the disease modifies the duration and intensity of the attack. Furthermore, in complications, especially localized typhoid infections such as periostitis and cholecystitis, and in the treatment of typhoid carriers, vaccines are of limited value. In local infections in which there is a secondary invading organism, as in pneumonia and otitis media, typhoid vaccines are probably contraindicated.

Careful bacteriologic and serlogic study is an essential prerequisite to vaccine therapy, which requires an exact etiologic and early diagnosis. Before the question of the efficacy of this form of treatment can be settled fully, the mechanism of the action of vaccines in generalized infections needs to be better understood; obviously, this is a problem in the field of

experimental medicine. In the meantime, the results at hand, which indicate that, used with discretion, vaccines not only do no harm, but also may be of benefit, should stimulate to further and careful observations.

G. Convalescence.—The patient should be kept in bed until the pulse regains its normal rapidity, and the amount of exercise that he is allowed to take should not be such as will increase the action of the heart beyond the normal rate. The patient should be allowed to sit up in bed. If this results in a marked increase in the heart rate, he should not be allowed to get up. It is also important that the nervous system should not be subjected to unusual irritation, and he should avoid cares and worries as far as possible. Protracted rest and a simple diet are essential features of this protective treatment.

Before releasing the patient from observation the stools and urine should be examined repeatedly for the presence of typhoid bacilli.

RHEUMATISM

The average case of rheumatism presents usually a history of repeated attacks of acute or chronic tonsillitis. "Sore throat" is also not uncommon in these cases.

TREATMENT

A case which is acutely ill should, of course, be managed like other cases of acute infection.

The bowels should be carefully watched as to their condition.

The use of salicylates in rheumatism should be governed by observation of the effects of the quantities administered. Miller (*Jour. A. M. A.*, Sept. 26, 1914), after a thorough investigation of the effects of the salicylates in rheumatism, concludes: "As salicylic acid after absorption circulates and appears in the tissues as a salicylate, it cannot act as a germicide unless the increased carbonic acid tension in the joint, the result of inflammation, reconverts it into salicylic acid. Statistics show that patients receiving salicylate are free from pain much earlier than those not treated. As the treated patients much more frequently relapse

than the untreated, however, the total duration of pain in the treated and untreated patients may not be materially different. The period of stay in the hospital of patients receiving salicylate and of those receiving other forms of treatment is the same. Cardiac complications are not less frequent since the use of salicylates. In rabbits the prophylactic use of salicylate is of no value in preventing arthritis after intravenous injections of hemolytic streptococci."

Wood (*Abstr. Jour. A. M. A.*, June 13, 1914, p. 62) advises the use of acetates and citrates which are oxidized in the body into carbonates and therefore act as systemic antacids. The potassium salts, he believes, are slightly more active as diuretics than the corresponding salts of sodium and increase the completeness of the oxidative process in the body, thereby lessening the amount of uric acid to be excreted. From 20 to 30 grains of the salt should be given every two or three hours, or until the urine becomes alkaline.

PAIN

For the relief of pain a small amount of morphin is better than a large amount of a coal-tar product. This is always true when pain is constantly recurring. The repeated administration of any coal-tar preparation is inadvisable in acute conditions.

The most important measure is immobilization and protection of the inflamed joint. Measures should be employed which increase hyperemia, such as wrapping in cotton batting, hot applications and counter irritation.

The care of the individual joints which are inflamed cannot be dogmatically dictated. The joint and limb should be placed in the position that gives the patient the most comfort. If several joints of a limb are involved, and especially if there tends to be more or less troublesome muscle contractions, or an inadvertent movement causes excruciating pain, a splint may be devised to keep the limb at rest. Whether cold applications or warm applications are the best for other joints, depends on the feelings of the patient. Too continuous cold is perhaps best not applied, as tending so to deteriorate the circulation of the part as possibly to do harm. Generally, warm, moist applications, and

perhaps nothing better than alcohol fomentations (one part of alcohol to 3 or 4 parts of warm water; a towel or napkin soaked in this and then wrung out just sufficiently not to drip, and this wound around the joint and then covered with oil silk) will probably give as much comfort as any application. These should be changed as frequently as they are cold. Sometimes dry cotton around the joint causes as much comfort as any application. The official methyl salicylate may be applied, or oil of wintergreen, but probably neither is more valuable than the above alcohol dressing.

Later when the acute inflammation in the joint has subsided, but the inflammation tends to persist in certain joints, ichthyol applications are much used and seem at times to be efficient in hastening the absorption of exudates. Ichthyol may be used in from 10 to 25 per cent. mixture with glycerin, or with olive or other bland oil. When there is acute rheumatic inflammation in the joint, counter-irritation is contra-indicated, but when a subacute inflammation persists, either fly blisters or the actual cautery may be advisable.

Anemia which so often follows rheumatism is perhaps frequently due to abstinence from meat and the prolonged administration of salicylates and alkalies. The constant administration of iron throughout the disease and a not too long use of salicylates and alkalies will generally prevent this condition.

The convalescence following rheumatism should be prolonged until the patient is thoroughly able to attend to his work. If there is a cardiac complication, such a recommendation is positively necessary. It can never be determined how much endocardial inflammation was present, how much valvular inflammation and thickening will be permanent, or how perfect the repair of the heart may be. Also, even when auscultatory evidence of cardiac complication has not been discovered, there may have been some inflammation which should call for prolonged rest. The administration of small doses of an iodid, best sodium iodid, from 0.10 to 0.20 gram (from 1½ to 3 grains) three times a day, is often advisable. Such treatment has frequently seemed to hasten or aid in the complete recovery of endocarditis. Not every endocarditis from rheumatism leaves valvular lesions.

Meat does not cause rheumatism, and prolonged abstinence from meat is generally inadvisable, still but a small amount of purin foods should be taken for some time. Eggs, green vegetables, and cereals should constitute the main food; later, fish or meat once a day may be allowed.

VACCINE TREATMENT

Greeley (Abstr. *Jour. A. M. A.*, July 4, 1914, p. 62) treated patients suffering from rheumatism with vaccines made from streptococci isolated from the joints, the pharynx, the blood or the urine. He found universal improvement after the use of such autogenous vaccines. No case should be given a vaccine during an exacerbation, marked by acute joint swelling, pain or fever.

COMPLICATIONS

Circulatory weakness during rheumatic fever may be combated with strychnin, with camphor, with aromatic spirits of ammonia, rarely with alcohol, sometimes with caffein, and exceptionally with strophanthus or digitalis, the latter provided that there has not been prolonged high fever and there is no acute endocarditis present.

In the treatment of this disease, it should be urged that the heart be watched daily by stethoscopic examination, to note as soon as signs of endocarditis occur. This complication is so insidious that it may not cause symptoms appreciable to the patient. There may, however, be an increase of temperature, as there may be cardiac pain or distress. While it is not the object of this article to describe the treatment of endocarditis, it may be stated that an ice bag over the heart may inhibit the inflammation, that the salicylates should be stopped if endocarditis occurs, and that rest and convalescence after such a complication should be greatly prolonged.

CHRONIC ARTHRITIS

Chronic arthritis develops not only as a result of long continued bacterial infection but also on a basis of metabolic disturbances, gastro-intestinal derangement, etc. The blood carries to the joints "chemical products of bacterial growth, products derived from

the gastro-intestinal tract, metabolic products of organ activities, and drugs, such as lead." Bacteria may locally infect a joint and produce substances that are irritant. Mechanical injury to the joints whether irritation, pressure, overwork, or insufficient circulation from some old injury or anything that disturbs the nutrition of a particular joint or set of joints may become causes of chronic arthritis. The following localities deserve attention as being the possible sources of toxins in such cases: the teeth, tonsils, nasopharynx, bronchial tubes, bronchiectatic cavities, infections of the gall bladder, appendix, seminal vesicles or Fallopian tubes.

TREATMENT

"The main problem," says Billings (abstr. *Jour. A. M. A.*, Oct. 10, 1914, p. 1325), "is to get rid of the systemic infection." Primary rest is necessary as long as motion causes pain. The etiologic factor must be sought and removed if possible. The metabolism of the patient should be studied thoroughly, and the analysis should include repeated examinations of the excretions. Worry, nervous frets and mental irritation should be avoided.

In the treatment of individual joints, the measures mentioned under rheumatism should be borne in mind. Hyperemia about the joint may be produced and body baking may be of value in more generalized affections. In varying time, from four to six weeks, according to Billings, passive motion with gentle massage may be begun. The amount of passive exercise must be gauged by the effect on the individual. The patient, always more or less nervous, tires easily. To these patients tire is painful. Day by day the exercise must be increased. The rest, restorative measures (food, etc.), should improve the general nutrition and blood circulation. The passive exercise will gradually improve the local blood circulation and oxygen supply to the infected tissues. In due time active exercise is added. This must be systematically and regularly performed. Usually a nurse or masseuse should teach the patient the lighter forms of calisthenics. These measures, namely: rest, restorative food, pure air, environment of optimism, graduated passive and later

active exercises will overcome the debility, malnutrition and poor general circulation. They will also help to restore the local circulation and oxygen supply to the infected tissues. By these measures the natural defenses of the body are improved, the infected tissues become richer in oxygen and consequently a poor culture medium for the invading micro-organism. Finally the destructive progressive metabolic changes of the tissues cease. Gradually one may note favorable changes in the joints. Atrophied, contracted muscles increase in bulk and functionate. But one dare not relax the control of the patient. Daily systematic passive and active exercises increased gradually must be continued until a relative restoration occurs. Otherwise a relapse is apt to occur because of neglect of one or more of the above important factors relating to nutrition, general and local blood supply, etc.

Autogenous vaccines made up of the dominating strains of streptococci obtained from the tissues and exudates of the focus of infection have been used by Billings. The dose used has been from 100,000,000 to 1,000,000,000. The large dose does not seem to be any more effective than the small one. The use of autogenous vaccines appears to increase the defenses of the body as judged by a study of the opsonins and phagocytic index. It is Billings' opinion that the general measures of management and treatment are absolutely necessary to succeed in helping these patients. To this management may be added autogenous vaccination without fear of harmful results. The use of vaccines in the treatment of chronic deforming arthritis without attempting to find or remove the dominating etiologic focus of infection and without a systematic hygienic management is irrational and most unjust to the patient.

Medicinal treatment, except such treatment as is aimed to promote digestion, proper bowel activity, proper circulation, and proper character of the blood, is of little value. If there is thought to be hyperacidity of the secretions or at least decreased alkalinity, alkalies may be of value, but certainly alkalies should not be pushed to the point of interfering with stomach digestion. Salicylates are of but little value

in chronic joint disturbances. Iodids in large doses will produce waste, and may be what a fat patient needs. Small doses of iodid stimulate the thyroid to extra activity, promote general metabolism, and may be of value in the individual case. Colchicum in chronic arthritis is probably of little value except as it may increase intestinal activity. All of the various lithia salts, and all of the various laxative and alkaline waters have no specific action, but if combined with increased muscular activity increased activity of the skin, increased drinking of water in proper selected cases, a regulated diet and a regulated life, in other words, proper regime, they may be of apparent benefit. It is the regime, however, and not the particular kind of lithium or other salt that works the cure.

ARTHRITIS DEFORMANS

The etiology of this disease is only now being worked out. The relation of infection elsewhere in the body, to this disease has been emphasized, especially by Billings and cannot easily be overestimated. The changes in the joints are not due to the absorption of toxins from the focus alone, but to actual localization of the bacteria themselves. The difficulty in obtaining the causative organism is great, owing to chronicity; but by improved methods Rosenow has succeeded in isolating peculiar streptococci from the excised lymph-glands draining the involved joints, from contracted and diseased muscles, and from excised portions of the diseased capsule of the joint itself, and recommends the use of the vaccine prepared from organisms thus isolated rather than from the streptococci in the focus. The use of even these vaccines, however, is quite futile unless the focus is removed. The peculiar character of the changes, in which there is a proliferation of endothelial cells in the blood-vessels about the involved joints with a consequent anemic necrosis, makes it clear that no matter what vaccine or other remedial agent is used, cure in advanced cases will be exceedingly difficult. Removal of the focus, the judicious use of autogenous vaccines in small doses prepared not from the focus but from the adjacent lymph-gland or tissue itself, together with rest, good air, passive motion and forced feeding comprise

at present the rational procedures and are yielding substantial results. The streptococci isolated are quite different from those obtained in rheumatism; hence the uselessness of employing rheumatism vaccines.

TETANUS

The occurrence of thousands of cases of tetanus in the soldiers engaged in the war between the dual and triple alliances and the numerous cases in our own country following Fourth of July injuries, makes the prevention of tetanus an important subject. The anaerobic organism responsible for this disease is, it has been said, widely prevalent in the soil of France and Belgium, where most of the war was carried on, due to the intensive cultivation of the soil in these countries.

THE PREVENTION OF TETANUS

For convenience the important points in the prophylaxis may be summarized as follows:

1. Carefully and thoroughly remove every particle of foreign matter from the wound, laying it open, if necessary, under anesthesia.
2. Dry the wound thoroughly, and paint it and the surrounding parts as carefully as possible with iodine, or else cauterize it thoroughly with a 25 per cent. solution of phenol (carbolic acid) in glycerin or alcohol.
3. Apply a loose wet pack, using a solution of some such antiseptic substance as boric acid or alcohol.
4. As soon as possible inject intravenously or subcutaneously 1,500 units of antitetanic serum and continue the injections if indications of possible tetanus arise.
5. In no case close the wound. Allow it to heal by granulation. Remove the dressings and packing each day and apply fresh ones.

Ritter, on the basis of observation of 60,000 wounded in Bavaria, believes that our ordinary measures are not sufficiently severe; 0.7 per cent. of the wounded died and 0.4 per cent. of the deaths were caused by tetanus. Even prophylactic injections of serum were not always able to ward off the disease. Freidrich makes a practice of excising the wound all around for 1 cm. into sound tissue, both at the surface and in the depths. This method is the ideal, Ritter

declares, but it is not always applicable. Another method is to apply hyperemia according to Bier's stasis technic. This washes out the wound from within on account of the higher blood pressure in the tied-off limb. He urges a trial of this measure on a large scale. Copious application of Peruvian balsam or its equivalent checks the production of hard crusts behind which the secretions can accumulate. Painting with tincture of iodine is a step in the right direction, he reiterates, but it does not go far enough.

THE TREATMENT OF TETANUS

The use of full doses of antitetanus serum given as soon as the earliest symptoms appear is the measure of greatest importance in the treatment of this disease. Irons (abstr. *Jour. A. M. A.*, Oct. 14, 1914, p. 1505) analyzed the results of 225 cases of tetanus treated with various measures.

Irons believes that the delay of treatment until the second or third day of symptoms, and the small doses (1,500 to 3,000 units) which a number of these patients received, go far toward explaining the failure of these methods to reduce the death-rate in this series below 50 per cent. The unfortunate fact that often patients do not apply for treatment until the second or even the third day of symptoms can not be used as an argument against a method of treatment which offers a reasonable hope of success if instituted early in the disease. Magnesium sulphate was given intraspinally in eighteen cases which also received serum. Four cases, two acute and two chronic, recovered giving a mortality for the group of 77 per cent. In two cases death occurred shortly after the injection, with symptoms of respiratory paralysis.

Irons emphasizes that it is important that the full effect of the antitoxin should be obtained immediately and this may be accomplished by giving 3,000 to 5,000 units intraspinally and 10,000 to 20,000 units intravenously at the earliest possible moment after symptoms of tetanus appear. On the following day the intraspinal injection may be repeated. The blood remains strongly antitoxic for several days. On the fourth or fifth day 10,000 units should be given sub-

cutaneously to maintain the antitoxin content of the blood. If only a small amount of antitoxin (3,000 to 5,000 units) is available it should be given intraspinally. Intraspinal and intravenous injections should be given with all the precautions usually employed for these methods.

This use of antitoxin in no respect replaces other necessary recognized non-specific methods of treatment in tetanus. Surgical treatment of the site of infection should be instituted at once. The patient should be placed at rest in bed in a quiet, darkened room, and should receive sufficient sedatives to control convulsions, together with adequate supply of fluid nourishment, and attention to the elimination by kidney and bowel. The necessity for large and continued doses of sedatives such as chloral or chlorbutanol should not blind the physician to the possible danger of giving an overdose. The condition of the patient should be carefully watched, and a revision of the standing orders for sedatives made whenever symptoms suggest the decrease or increase of dose.

When tetanus is once installed, according to Weintraud, who observed numerous cases among the German wounded, little can be hoped from serum treatment but we have an important symptomatic aid in the Meltzer and Auer's magnesium sulphate treatment. The dosage when given subcutaneously should be 15 or 20 c.c. of a 20 per cent. solution or 12 or 16 c.c. of a 25 per cent. solution.

Permin (abstr. *Jour. A. M. A.*, Jan. 10, 1915, p. 170) examined the reports of 388 cases in Denmark. He suggests the following method in severe cases: Proceed the moment the tetanus is diagnosed to draw 16 or 33 c.c. of cerebrospinal fluid by lumbar puncture and inject 1,000 or 2,000 antitoxin units. With extreme opisthotonos slight general anesthesia may be required. The foot of the bed should be raised to send the serum up the spinal canal. If lumbar puncture is impracticable, he makes an intramuscular injection of the same amount. Then the wound is examined and foreign particles removed, the opening enlarged, and the cavity rinsed with some antiseptic and tamponed with silver nitrate gauze, providing for ample drainage. The intraspinal or intramuscular

injection is repeated each day for five or six days and then every third day until marked improvement is observed.

The serotherapy by no means does away with the necessity for chloral or morphin. The dosage must be proportional to the age of the patient and the severity of the tetanus. Some clinicians give very large doses of chloral, but Permin thinks it is wiser to keep below the maximum dose and supplement the chloral with morphin, keeping the patient in a quiet, darkened room. It is of the utmost importance that the patient should get adequate nourishment as the resisting powers depend to such an extent on this. Fluid foods are best and with extreme lockjaw it may be necessary to pull a couple of teeth to permit the introduction of a rubber tube through which fluid nourishment can be poured into the mouth.

Daumsler, chief physician of the French army, administers 6 gm. of chloral every six hours until the patient is in a state of torpor and all hyperexcitability is abolished.

Sainton says that six patients of twenty-two with tetanus recovered. In two of these the tetanus was of the severest type. His treatment consisted of a subcutaneous injection twice a day of 40 or 50 c.c. of a 2 per cent. solution of phenol—the Baccelli method. The patients were isolated in semi-darkness, and twice a day each was given an enema consisting of 6 or 8 gm. of chloral, one or two yolks of eggs and 250 gm. of milk. The phenol injections were kept up more than a month in two cases, one receiving a total of 48 and another 88 gm. of phenol. The doses of phenol given by Sainton do not approximate the fatal dose, which is in most cases as much as 15 gm. ($\frac{1}{2}$ ounce). It should be remembered that tetanus is an extremely fatal disease, and all forms of treatment employ heroic doses of the remedies used. The doses given by Sainton are about 50 per cent., above those recommended by Baccelli. Baccelli thinks that patients with tetanus are extremely tolerant to phenol.

The dose of chloral is considerably above doses which have proved fatal in exceptional cases, but the chloral in tetanus is probably largely counteracted by

the convulsive condition of the patient. While the minimum fatal dose of chloral has been put at from 1.5 to 2 gm. (20 to 30 grains), much larger doses have been used in tetanus without serious results. In a case of tetanus, 93 gm. or 3 ounces were given in twenty-four hours without causing death. This is of course, exceptional. Anders recommends chloral to be given by rectal injections, 2.59 gm. or 40 grains, at a dose.

Other methods of treatment include the injection of hydrogen peroxid directly into the wound, exposing the wound to a continuous stream of oxygen, and the blowing into wounds of a powder composed of one part chlorinated lime and nine parts bolus alba (Kaolin), and the use of a dressing of powdered antitoxin.

CHOLERA

Cholera, which is infrequent in the United States, has been more widely spread recently in Europe, due to the traveling of large bodies of troops. It is regrettable that serum prophylaxis in this disease is not so efficient as in typhoid. Rosenthal (abstr., *Four. A. M. A.*, Oct. 10, 1914, p. 1330) gives the following outline of the prophylaxis: Each person can effectually protect himself against cholera by extreme cleanliness and avoiding unboiled water and uncooked foods. The most important general prophylactic measure is the isolation of the sick. The disease starts almost always with diarrhea, and although the patient may still feel quite well yet he is already scattering germs in his diarrhetic stools. A soldier with profuse diarrhea should go at once to the hospital and stay there. Even before it is possible for bacteriologic examination of the stools, the leucocyte count and blood-picture may reveal the presence of cholera infection and permit the discharge of the men with ordinary harmless diarrhea.

Even direct exposure to cholera does not necessarily entail the disease unless the system is depressed from any cause, and he urges for this reason restriction of the sale and use of liquor, avoidance of physical excesses, raw fruit, etc. Before eating and especially before preparing food the hands should be thoroughly

cleansed with soap and water. The face and particularly the mouth should not be touched by the hands. All fluids should be boiled before drinking, except beer, wine and natural mineral waters. If water has to be taken raw, the danger of infection can be materially reduced, he says, by adding a little acid, a knife-tip of citric acid to half a liter, or 20 drops of liquid phosphoric acid. The army corps should have a supply of each. He insists that it is unnecessary to use a disinfectant for the hands, and that spraying the rooms and clothes with a solution of phenol does no good whatever and merely serves to lull into false security. Disinfectants are of no use for the desired purpose except in the privies, and even here milk of lime is preferable to phenol. The linen and the dejecta from the sick require of course thorough sterilization. There is no transmission of cholera, typhus or dysentery through the air. In Bulgaria he used to see persons extremely punctilious in singeing their dishes with alcohol and toasting all their bread, and yet they would eat raw fruit and drink unboiled water.

The measures tending toward alleviation of disagreeable symptoms should be adopted. Diarrhea should be checked, castor oil may be given to govern bowel's movements and bismuth subnitrate to cover denuded portions of the intestine. Morphin is useful in alleviating cramp.

Brachio, in a recent severe epidemic in Europe, (abstr. *Jour. A. M. A.*, Oct. 3, 1914, p. 1236) found iodine extremely effective, the best method being an intraperitoneal injection of a mixture consisting of iodine, $\frac{1}{4}$ grain, potassium iodide $\frac{1}{4}$ grain, distilled water, 20 M. In almost all cases the treatment was supplemented with a free use of epinephrin, dropping the solution on the tongue. Naamé has shown a striking analogy between the cholera syndrome and the symptoms from defective functioning of the suprarenals. He injects epinephrin subcutaneously in doses of 4 to 6 mg. in twenty-four hours, over several days, supplemented by saline infusion.

PNEUMONIA

Pneumonia is a general infection with a primary local manifestation in the lungs. There is no specific treatment, but the proper management of all details in the care of the patient causes a splendid percentage of recovery from this disease, which tends to recovery less than most acute infections.

Bronchial pneumonia is a disease of early childhood, of old age, and sometimes secondary to other infections, and to anesthesia; while lobar pneumonia may occur at any time of life. The duration of bronchial pneumonia is indefinite. Lobar pneumonia typically is self-limited, and from this standpoint tends to recovery, but complete recovery in any given length of time depends on the management of the patient.

The prevention of pneumonia in any individual is dependent on the establishment of resistance by observation of hygienic measures, the avoidance of undue exposure and the avoidance of alcoholic intoxication or other depression.

TREATMENT

Pneumonia of the sthenic type, which manifests itself by symptoms pointing to a forcible circulation is best treated in the open air. The high temperature which accompanies this condition may be controlled by methods not connected with drugging. The patient should be placed in the open air. The preparation of the patient for open air treatment in winter should be as follows: A blanket is spread over the woven wire spring large enough to extend beyond the sides and below the foot. Over this is spread a rubber sheet or paper and then the mattress. Next the blanket and rubber sheet are folded up over the mattress and secured with safety pins. The patient is clothed in a light suit of flannel, stockings and a hood. He is covered with enough to keep him warm. The lighter weight warm clothing, such as eiderdown quilts, if possible, are preferable. A hot-water bag at the feet completes the equipment. Hyperpyrexia, or prolonged temperature of 104 F., can be well combated by rolling the bed of the patient into a warm room or closing the windows and warming up the room in which he

is ill, and sponging him with tepid, cool or cold water, depending on the height of the fever.

For cleanliness the patient, unless critically ill, should be sponged daily with hot water or with tepid water. Meara emphasizes the necessity for careful cleansing of the mouth, nostrils and eyes of pneumonia patients. The exact method and the simple solutions used may depend entirely on the choice of the physician and nurse. There is nothing that better shows the ability of a nurse than the condition of the tongue, teeth and mouth of a seriously ill patient.

Whatever is done for the patient must be done at regular intervals, as prolonged periods of rest with as little disturbance as possible are very important desiderata in pneumonia.

When lobar pneumonia exhibits a tendency to asthenia or depression, the open air treatment should be given in moderation, a sufficiency of pure warm air being supplied and the extremes of cold being avoided.

Diet.—The quantities of protein and fuel given are less than the minimum health rations; the diet as a whole is non-putrefactive; and it should include a sufficient quantity of the food salts needed by the body, especially the calcium salts, of which a deficiency regularly exists in pneumonia. The purpose of the diet is to supply nourishment sufficient to carry the patient through the short period of this disease with a minimum of trouble from the alimentary tract, that region of special danger in pneumonia, whence may come general poisoning, vasomotor paralysis, nervous disturbances of the heart through reflexes and mechanic disturbances from distension.

If there is gastric irritability, diarrhea or tympanites, the diet should be reduced. Peptonized milk and barley water, or the latter alone, may be given. Care should be observed in the giving of fluids so as not to overload the right heart.

The following is cited by Barr to serve an adult in the acute stage for twenty-four hours: About 2 pints of milk, 2 or 3 pints of barley water, whey, or plain water, 6 or 8 ounces of syrup of glucose, 4 or 5 drams of table salt, and 1 dram of the glycerophosphate of calcium. If the syrup of glucose be too sweet or

mawkish, a quarter of a pound of sugar of milk can be used. Later on the patient can have peptonized bread and milk or some infants' food, broths, raw eggs, jellies, cocoa or coffee, and a few biscuits. He can have cold water when he likes.

General Medication.—In the beginning of this disease, as in others, a dose of 0.15 gm. (2 grains) of calomel may be given, followed by a saline.

If in spite of careful management of the diet and of the bowels meteorism occurs, a colon tube should be passed to evacuate the gas in the lower intestine. If the temperature is high, an ice coil over the abdomen will reduce the temperature, give tone to the intestines, and often is more efficient than the much-advocated hot turpentine stupes in causing expulsion of the intestinal gas. Enemata containing turpentine are advised, but it is rarely that rectal injections will relieve tympanites of the small intestine. Such distention is generally caused by paresis of the muscle coats of the intestine, and sometimes strychnin hypodermatically may be effective, in doses of 1/30 of a grain, three or four times in twenty-four hours if the condition is not serious. Sometimes eserin (physostigmin) given hypodermatically is effective in removing the condition. Aseptic ergot, injected intramuscularly, is sometimes of the greatest value in restoring tone to the intestines.

Barr states, "There is usually a paretic condition of the intestinal tract, and any food decomposition is apt to give rise to acute dilation of the stomach and bowels; when this occurs pituitary extract is the remedy *par excellence*."

Cheinisse (*Presse Medicale*, April 11, 1914) reviews a number of articles that have been published in the last year or two on the therapeutic value of camphor. Crouzon advocates adding a little ether to camphorated oil to render it more fluid and thus promote its absorption when injected intravenously; Schule uses ether alone for the vehicle. Subcutaneous injection of camphorated oil have been applied with apparent success in pneumonia by four Russian physicians and by several in Germany. Evidence is accumulating that camphor has a bactericidal action on pneumococci. Hötzel

injected subcutaneously twice a day 10 c. c. of camphorated oil in thirty cases of pneumonia and is convinced that it had a specific action. The pneumococcus cannot be cultivated on culture medium containing 1 per ten thousand camphor. Rabbits inoculated with the pneumococcus were saved by a series of subcutaneous injections of camphor without which the controls died. Weihrauch ascribes the antipyretic influence of camphor to its bactericidal action on the mixed infection. When in pneumonia the heart action is good, Svoiekhotov gives the camphor by the mouth every two hours up to the crisis and then at longer and longer intervals for a few days. If the pulse is already up to 120, he begins at once with subcutaneous injections of camphorated oil. The use of camphorated oil in heart weakness is well known.

Rosenow has suggested the use of alkalies as of distinct specific action in pneumococcus infections. These may be given in the form of citrates diminishing the viscosity of the blood, and if given by mouth supplying an agreeable fluid.

Care of the Heart.—Changes in the blood pressure, the heart rhythm, the quality of the heart sounds, the pulse tension and the respiration as manifested by embryocardia, tachycardia, dyspnea, etc. should be noted at once and proper corrective measures instituted. If stimulation of the heart is needed, it is given by Cornwall according to the following plan. In the aged, in alcoholics, and in patients with preexisting myocardial disease, it is given from the beginning. In young adults with originally healthy hearts it is usually delayed until signs of heart-strain appear, which is generally not later than the fourth day. The first stimulant given is strychnin sulphate, in doses of one-sixtieth grain three to six times a day. If more stimulation is needed, tincture of strophanthus is given in doses of one and a half minims every four hours. The strychnin sulphate is increased on occasion to one-thirtieth grain every four hours, which is the maximum amount of that drug permitted in this disease, and the strophanthus to two or three minims every four hours. In a large majority of cases, Cornwall states, more than this stimulation is not called for, but

if it should be required, caffein citrate in doses of 1 to 3 grains every four hours is added. In cases with extremely low-blood pressure, epinephrin is given, hypodermically or by mouth. If there is an obstinately dilated right ventricle, digitalin is given hypodermically, in addition to the other heart stimulants. For extreme dilatation of the right ventricle threatening disaster, Cornwall believes venesection to be indicated. Whiskey, in small doses, is given to alcoholic patients and to the aged if they bear it well. Recent observations seem to indicate that strychnin has not a direct effect on the blood pressure.

Venesection may be indicated in the first stage of pneumonia in plethoric individuals, and certainly has saved life. Brisk purging, the stopping of pain with morphin, and a hot foot bath will often relieve the necessity for venesection.

Vaccine Treatment.—The value of vaccines in the prophylaxis or treatment of pneumonia is very doubtful. The possibility of undermining the resistance of the patient must be considered.

Convalescence.—In convalescence from pneumonia, the greatest of care should be exercised to protect the heart, which has been so severely overworked, from becoming more or less dilated and from permanent damage to its musculature. The increase of food should be carefully regulated, getting up should be very gradual, and all heart tire from the early ambulatory condition should be carefully guarded against. Not only the lungs need repair after pneumonia but also the heart.

A patient is rarely thoroughly over the effects of pneumonia for six months, and if he is able financially to go to a warm climate, if it is winter, or to a dry climate if it is some other season, and rest for two months after his apparent complete recovery, his lungs and heart will be guarded against sequelæ from pneumonia.

ERYSIPELAS

The treatment of erysipelas has been adequately discussed in a recent article by Erdman (*Jour. A. M. A.*, Dec. 6, 1914, p. 2048). He analyzed results in eight hundred cases seen in Bellevue Hospital, New York.

Etiology.—In the majority of cases of the facial type the point of entrance of the infection was through the nasal mucosa following a coryza. In others there were abrasions of the scalp or face, and in many instances, the infection began in an operative wound. In cases with a widespread body involvement, the infection was either migratory from the face or extremities, or, as was common in infants, began with an infection of the umbilicus, an irritation of the buttocks, etc. Leg ulcers and wounds were the usual origin of infection in the extremities.

Onset and Course.—The attack usually begins with chills, general malaise, headache and a rise of temperature, which precede the appearance of the local lesion by from twelve to twenty-four hours. In many cases, however, the burning and redness of the skin are the first symptoms noted.

Typical facial erysipelas which starts at the bridge of the nose and spreads in butterfly pattern rather symmetrically over the cheeks, may remain thus limited, but in many cases it proceeds to involve the ears, the forehead, the scalp and the neck, down to but not beyond the collar-line, except in the small percentage of cases which are of the migratory type.

“Erysipelas which starts on the face or trunk and spreads to the extremities usually travels down both arms or legs with remarkable symmetry from day to day.

Diagnosis.—The diagnosis should be made from the characteristic skin appearance, the fever, bleb formation and desquamation.

TREATMENT

Internal medication should consist of such sedatives, stimulants or cathartics as the symptomatology may indicate.

On the affected part, continuous cold compresses of boric acid solution may be of value. In migratory cases ichthyol may be applied or the areas may be painted with picric acid solution. Erdman found vaccines of little value either in shortening the duration of the disease, decreasing the mortality or preventing recurrence.

Arneth (*Abstr. Jour. A. M. A., Oct. 24, 1914, p. 1513*) applies three or four times a day a 5 per cent. solution of phenol in oil. He finds this method very satisfactory.

TYPHUS FEVER

The recent developments in our knowledge of the etiology and transmission of this disease have been largely due to American investigations. These advances have resulted from the clinical observations of Brill and the experimental work of several scientists, notably Ricketts, Anderson and Goldberger.

Typhus fever is doubtless of microbic origin, but the infective agent has not yet been determined with certainty. Recent studies by Plotz indicate that it is a minute bacillus. While the etiology of the disease has just been determined, its mode of transmission has been worked out so that we are able to take reasonably efficient means for its prevention. It has been well demonstrated that the disease is communicated by the body louse and probably also by the head louse. This observation explains many puzzling features, for example, as McCrae remarks, the decrease of the danger of infection when the patient was removed to a hospital and the great danger to attendants in epidemics, to which Murchison drew attention.

The transmission of the disease to monkeys has enabled it to be made the subject of exact experimental work. Typhus fever formerly was very prevalent in epidemics, and also as sporadic cases, being known under the names of jail fever, camp fever, ship fever, etc., terms which indicate its close association with overcrowding and filth. With the progress of sanitary science, the prevalence of the disease decreased until it appeared to have vanished with the march of civilization, especially in this country.

In the United States the disease, in its typical form, has been found usually in ships coming into our sea-ports. A mild form of the disease has been discovered even in our farthest inland cities. It is important that the existence of this mild form should be borne in mind not only as explaining many puzzling cases but also as the possible source of epidemics when the organism may assume unusual virulence or the opportunity for

transmission be unusually great. Clinically, the disease displays the absence of a characteristic course with the exception of the petechial eruptions. It is a general fever, in its severer forms, presenting the characteristic typhoid state. It is a striking fact that this typhoid state is observed with comparative rarity in modern epidemics of ordinary typhoid fever. The incubation period is put usually from four to fourteen days. The onset is abrupt, with headache, general pains, and frequently with one or more chills. The eruptions appear from the third to the fifth day and the face is much reddened and swollen but rarely shows the characteristic spots. The temperature remains high, usually from 104 to 105 throughout the attack. The fever terminates by lysis in a great proportion of cases, contrary to the general belief, although several authors describe only a crisis lasting from 12 to 48 hours; this is a frequent termination of the disease. The duration is usually from twelve to fifteen days.

The prevention of the spread of this disease is a comparatively simple problem, although, as experience in the present war shows, it may be very difficult of accomplishment. It consists essentially in the destruction of vermin. This involves, of course, at the same time the removal of filth, the cleaning of the inhabitants, and the prevention of accumulation of waste. The treatment should be symptomatic following the suggestions made for other infections.

SYPHILIS

The finding of the organism of syphilis, the *trepone* *pallidum*, in the initial lesion either by staining or the dark stage methods is, of course, the conclusive evidence of a syphilitic infection. The diagnosis of the disease must be considered, however, as it applies to various groups, the patient with a sore, the patient with a sore and an eruption, the patient with an eruption or sore throat or both, the patient with nothing visible and nothing palpable, and the patient who comes with a typical case of general paresis, or tabes or cerebrospinal syphilis. In making a diagnosis the physician should use every available diagnostic aid, including the Wassermann test, and perhaps also the luetin test. Just what reliance should be placed on

the Wassermann test is a question worthy of consideration. In the presence of good clinical evidence of the presence of syphilis, a negative reaction should receive, probably, scant consideration. Treatment might better be instituted and repeated Wassermann tests made later in an attempt to confirm the diagnosis. A positive reaction in the absence of reliable clinical evidence seems to indicate the need of further inquiry into the history of the patient and repeated Wassermann tests while instituting treatment.

EARLY TREATMENT

The patient should be instructed regarding the observance of good general hygiene. A nutritious simple diet, total abstinence from alcohol and tobacco, a proper amount of fresh air and physical exercise are essential to the tolerance of the disease and the strenuous treatment.

THE CARE OF PRIMARY LESION

Ordinarily it will not be necessary to cauterize the primary lesion. Ordinary cleanliness and protection should be used. Whatever the dressing it should not be irritant lest it cause inflammation of the surrounding tissues. If the lesion is syphilitic, it will heal readily following internal treatment.

SALVARSAN AND NEOSALVARSAN

The use of salvarsan and neosalvarsan early in the disease is productive of an early disappearance of external lesions and if sufficiently early will often prevent the appearance of such secondary signs as the eruption, sore throat, alopecia, systemic disturbances, etc. The dose of salvarsan should be graduated to the weight of the patient. It may be administered intravenously, intramuscularly or subcutaneously, the former method being by far the most popular one. Care should be taken in the technic; the preparation of the drug; the choice of site of injection, etc.; to prevent such complications as thrombosis, phlebitis, sloughing of tissue, embolism, or optic atrophy. An optic neuritis is generally considered to be a contraindication to the use of these drugs. The neosalvarsan is

more easily prepared than salvarsan but has been determined to be of about one-third the strength. Treatment with salvarsan should be combined with mercury in various preparations, and the Wassermann should be a guide in the intensity of the treatment.

MERCURY

In those cases in which it seems preferable to administer mercury internally, the preparations best adapted for use are the protiodid, the biniodid, the bichlorid, and mercury with chalk. The protiodid may be given in doses of 0.015 to 0.02 gram ($\frac{1}{4}$ to $\frac{1}{3}$ of a grain) three or four times a day, the smaller dose and less frequently repeated if the medicine causes too frequent movements of the bowels. When this form of treatment is adopted, it should be employed constantly over as long a period as eighteen months.

The inunction treatment is an efficient method of attacking the disease if it is done in an efficient manner. As a general rule the patient cannot be trusted to conduct this treatment alone. A course of inunction treatments may consist of 20, employing 4 grams (a dram) of the official mercurial ointment, rubbed well into the different parts of the body, once a day, the treatment lasting at least 15 minutes. A turkish bath or "body bake" at least once a week is advisable.

A third method of administering mercury which is probably most popular in recent years, is that by intramuscular injection. The most favorable site is usually the gluteal region. The lower part of the buttock should be avoided in order that the patient may sit without undue discomfort; the center of the gluteal region should be avoided because of the danger of puncturing gluteal vessels or the sciatic nerve. Of course the two sides should be used alternately in giving a series of injections.

The best syringe for these injections is one made entirely of glass, of small caliber, and graduated to fractions of a minim, such as is made for tuberculin injections. The needle should be from $1\frac{1}{2}$ to 3 inches in length. Steel needles are much cheaper than those of iridoplatinum, but are likely to be corroded by soluble mercurial salts.

The fluid is drawn into the syringe, and any air bubbles carefully expelled.* Then the skin having been properly cleansed, the needle is thrust through it in a perpendicular direction so as to reach the required depth at a single stroke. Next assure yourself that the point of the needle does not lie in a vein, by detaching the barrel and watching the lumen for a moment. If blood flows through the needle, make another puncture; otherwise replace the syringe and proceed with the injection. It is not necessary to massage the injected mass. The most careful practice is to make the injections with the patient lying face downward, but those well accustomed to the procedure may be properly injected standing, provided they are required to relax the gluteal muscles. The dressing of the puncture is necessary only when bleeding occurs.

The preparations of mercury used in this way include both soluble and insoluble salts. The most useful soluble salts are the benzoate and the biniodid. These are well tolerated and efficient, and all others are superfluous, in the opinion of Levy-Bing, as expressed in his monograph on intramuscular mercurial injections, published in Paris, in 1909. The salts mentioned are used in 1 or 2 per cent. solution, in isotonic saline solution. The insoluble salts most frequently used are the basic salicylate, calomel and grey oil, the latter being an emulsion of metallic mercury in an oily vehicle. "The vehicle for calomel and the salicylate may be either an oil or a mucilage. The combination recommended by Levy-Bing of 3 parts of anhydrous wool-fat with 7 of white liquid petrolatum has proved satisfactory. It is most important that all these substances be pure and neutral. Calomel should be especially pure, and should be washed in boiling alcohol before being incorporated with the vehicle, and both calomel and mercury salicylate should be finely divided by prolonged trituration with the menstruum.

Both of these preparations may be sterilized in a water-bath; the grey oil, however, is spoiled by heat and consequently must be prepared from sterile materials with sterile utensils and under aseptic conditions. As the process consists of a trituration of the mercury

with the wool-fat for at least two hours, it may be imagined what a formidable task this is. If carefully guarded from contamination these injection fluids need not be repeatedly sterilized." (Pulsford)

Injections of soluble salts should be used when rapid mercurialization is required. They may be used at the beginning of treatment. The insoluble salts are indicated in the routine treatment of most cases. Calomel is usually more effective in urgent cases, but it causes too much pain to use in ordinary cases, in which the salicylate and the grey oil are preferable.

In beginning treatment it may be necessary to give an injection every day for a few days; but afterwards a weekly injection will be sufficient.

The average weekly dose is 1 grain of metallic mercury, $1\frac{1}{6}$ grains of calomel, or $1\frac{2}{3}$ grains of salicylate of mercury.

Among the disadvantages of this form of treatment should be noticed the fact that they are more or less painful. With the soluble salts the pain begins at once and lasts for from 1 to 6 hours. With insoluble preparations it begins within an hour, and lasts from two to five days. The pain is most severe after calomel, and least so after grey oil, which is often entirely painless.

Hard masses of exudates, known as nodes, sometimes forms about the injected mass. These often retain a part of the injected fluid, which may subsequently be suddenly absorbed.

Embolism sometimes results from the injection of the fluid into a vein. Although this has rarely, if ever, proved fatal, it should be avoided. Abscesses rarely occur if the injections are properly administered.

Whatever method of administering mercury is adopted, certain general hygienic rules must always be observed. The teeth must be put into good condition and the mouth must be kept clean. Chewing tobacco must be absolutely interdicted. Moderate smoking and temperate drinking may be allowed to those who are accustomed to the use of tobacco and alcoholic drinks, unless some special condition renders it advisable to discontinue their use entirely.

IODIDS

While the iodid of potassium is the salt most generally used, the sodium iodid is perhaps preferable, since the sodium element is not as debilitating to muscle tissue as is the potassium. This is especially true of the cardiac muscle. Hence when large doses must be given, or when the doses must be prolonged, the iodid of sodium should be preferred. This salt also sometimes seems less likely to disturb the stomach.

The symptoms of iodism should be avoided if possible. These symptoms are coryza, frontal headache, reddening of the eyelids, a strong, metallic taste in the mouth, sometimes a profuse flow of saliva and gastric indigestion. It is unimportant whether the iodid is ordered largely diluted or in saturated solution, but it should never be ordered in any syrupy, nasty mixture. It is preferably administered in milk or in an alkaline water. It is generally best administered after a meal, theoretically best an hour after meals, as it slightly inhibits digestion. When an iodid is administered the yellow iodid, i. e., the protoiodid, of mercury should not be the salt selected for simultaneous administration, as it is likely to be chemically changed into the biniodid (red iodid) of mercury, which salt would then be present in a poisonous quantity. The following prescriptions may be used:

| | | |
|-----------------------------|-----|---------------|
| | Gm. | |
| R Sodii iodidi..... | 25 | |
| Aquae destillatae, q. s. ad | | |
| saturandum | | q. s. ad sat. |

M. et Sig.: Five drops with milk or water, three times a day, after meals.

Each minim of this solution represents a grain of the drug.* The dose should be gradually increased until the amount given is deemed sufficient.

Or

| | | |
|------------------------|-------------|-----------|
| | Gm. or c.c. | |
| R Potassii iodidi..... | 10 | or 3 iiss |
| Aquae | 100 | ℥ss iii |

M. et Sig.: One-half a teaspoonful, in milk or water, three times a day, after meals.

* The statement frequently made that a drop of a saturated solution of potassium or sodium iodid represents a grain of the drug is apt to lead the physician into error, as the size of a drop varies with the size and nature of the container from which it is dropped. See THE JOURNAL A. M. A., Oct. 21, 1908, p. 1526.

The iodids have been given in enormous doses, especially where gumma of the central nervous system has been diagnosed. It is a question whether such large doses are justifiable and even whether such large doses are of advantage. It is probable that ordinary fair-sized doses can do as much chemical and biologic good, as any dose however large, in causing resorption of connective tissue formations, the blood and cells being only able to absorb and utilize a certain amount of iodin. In other words, enormous doses are illogical and are probably rapidly passed out of the body by the excretions.

Jobling and Petersen (*The Journal*, November 28, 1914, p. 1931), say: "Clinical experience teaches us that in the tertiary stage of syphilis iodin is almost a specific in bringing about the amelioration of symptoms, and the disappearance of lesions, and yet little is known concerning the means by which these results are obtained.

"As experimental work and clinical observations have demonstrated that the iodids do not destroy the infecting organism, we must assume that the results obtained are due to the power the iodids possess of causing resolution of the lesions present. That this actually occurs will be attested to by every clinician of experience. It is due to the fact that the unsaturated fatty acid radicals which inhibit autolysis, have become saturated with iodin. As soon as this occurs, the ferments which are present, or which may be brought in, become active, autolysis takes place, and the necrotic tissue is absorbed. Here, also, the local action of the ferments is made less difficult by the reduction of the anti-enzyme in the circulating blood. It must be borne in mind that the iodids are not as effective in the earlier stages of syphilis when necrosis of tissue is not so evident.

"If the above interpretation of the action of iodin is correct, it gives the clinician a rational idea of what he is accomplishing when he gives iodids to a patient in the tertiary stage of syphilis. According to this view, iodin neutralizes the action of the agents which prevent resolution and absorption of the diseased or necrotic tissue, and at the same time lays bare to the

action of the real germicidal agent the infecting organism which previously had been protected by the necrotic tissue. With the exposure of the infecting organism, such agents as mercury and salvarsan would be much more effective."

CARE OF THE MOUTH

During the mercurial treatment the patient should drink plenty of water to promote the activity of all the organs of excretion. The mercury will probably soon cause sufficient or even perhaps too frequent movements of the bowels. The care of the mouth, teeth and gums is important, and the patient can not be too carefully instructed in this matter. Any alkaline wash, or, if there are any erosions, peroxide of hydrogen applications, or a mouth wash of alcohol one part and water three parts, or a potassium chlorate mouth wash, and occasionally tannic acid washes and gargles are useful. Ulcerations in the mouth and throat will often heal rapidly after one or two applications of a 25 per cent. solution of nitrate of silver. Without ulceration in the mouth and throat the mucous membrane may be kept healthy by a thorough cleaning of the teeth two or three times daily, and the cleansing of the mouth and throat with alkaline solutions.

The patient should be thoroughly instructed as to the danger of his infecting others and the manner of such infection, as by napkins, towels, drinking cups, spoons, forks, or kissing. Such instructions should be most explicitly given if there are mucous patches in the throat.

SYPHILIS OF THE NERVOUS SYSTEM

Swift and Ellis (*Archives of Internal Medicine*, September, 1913) suggested what is known as the auto-serosalvarsan method of treating syphilis of the nervous system. Almost coincident with this discovery Noguchi was able to demonstrate the presence of the *Spirochaeta pallida* in the brain tissue of general paralytics. Briefly the method consists in injecting salvarsan intravenously, waiting one hour, withdrawing 40 c. c. of blood, allow it to coagulate, then centrifugalize. The following day pipette off 12 c. c. of serum, and dilute with 18 c. c. of normal saline. Heat to 56 C. for

one half hour. After lumbar puncture withdraw the spinal fluid until a pressure of 30 mm. is reached. The barrel of a 20 c. c. all glass syringe is connected to the needle by means of a rubber tube about 40 cm. long. The tubing is then allowed to fill with cerebrospinal fluid so that no air will be injected. The serum is then poured into the syringe and allowed to flow slowly into the subarachnoid space by means of gravity. At times it is necessary to insert the plunger of the syringe to inject the last 5 c.c. of fluid.

Of this method Weisenburg (*Jour. A. M. A.*, March 20, 1915, p. 975) says: "The Swift-Ellis method reacts differently on different patients. I have not had serious complications, although one patient was unable to void urine for forty-eight hours and had to be catheterized. I have learned never to give a second spinal injection until the patient has altogether recovered from the previous one. Nearly always it takes a patient a longer time to recover from each successive injection.

"As to citation of more definite cases and results: In spinal syphilis, cerebrospinal syphilis and cerebral syphilis, the results have been splendid and better than could have been obtained from mercury alone. Practically all symptoms disappear which are dependent on the meningeal irritation, and only those remain which are the result of implication of the parenchymatous structure, as happens when a thrombosis of a vessel occurs with a consequent necrosis of the part, or what is more common, when there is an atrophy of the nerve cells and the fibers coming from them.

"In tabes my results have been good only in those cases in which there has been great meningeal irritation, that is, the pains have lessened, the patients have slept better and the general condition has improved vastly, but there has not been a return of knee jerks, pupillary reflexes or any of the symptoms which are dependent on permanent destruction of nervous tissue. I found that the Swift-Ellis treatment cannot always be given in tabes because the reaction is terrific in some instances, the pains being excessive, the patient having very marked pyrexia, and in one patient the reaction was so profound that

it took him about a month to recover. One cannot expect in this disease to cure what has already been destroyed, but it is possible to prevent further active inflammation, at least so far as those pathologic processes are concerned which are the result of the spirochetes located within the vessels and meninges.

"In paresis my results have not been good, but as has been previously stated, it is impossible in early paresis to make a differential diagnosis from cerebral syphilis. Therefore it is important to institute prompt and vigorous treatment in all early cases.

"As I have tried to emphasize in the early part of my paper, it is as important for the welfare of the patient to know when not to institute treatment. In a patient in whom the cell count is small and the Wassermann reaction is either faintly positive or negative in the cerebrospinal fluid, the Swift-Ellis method should never be employed, although salvarsan may be given intravenously a number of times, but the effects should be carefully watched, and if the patient does not react well, this treatment should cease. If, on the other hand, the patient improves, the treatment should be kept up."

The consensus of opinion seems to be that this method has a distinct field in the treatment of nervous syphilis.

Ravaut and many others have injected neosalvarsan directly into the cerebrospinal fluid in small dosage and have at times achieved remarkable results. There have however been numerous reports of disaster and the method must still be considered as in the experimental stage. Weisenburg says:

"I have used the direct injection of neosalvarsan in the spinal canal. In one instance it was given for me in a case of general paresis, and the reaction was milder than in some of the Swift-Ellis injections previously given. A subsequent injection in the same patient caused his death within forty-eight hours. As a consequence, I am afraid of this method and have not used it since. I have had no experience with the mercurial injection into the spinal canal as practiced by Byrne of Baltimore."

This field is a new one and the literature is growing rapidly. No doubt the methods described represent a great advance in the treatment of syphilis of the nervous system and the physician should endeavor to follow closely the new reports on this subject.

TUBERCULOSIS

Under the general title of tuberculosis are included the various pulmonary forms, abdominal forms, tuberculosis of the bones, glands and other organs of the body. This is a disease of civilization and hence due to the congregation and crowding of mankind into small regions, as cities. Thousands of persons suffering from pulmonary tuberculosis are walking our streets and expectorating billions of tubercle bacilli daily.

ETIOLOGY

The discovery of the tubercle bacillus by Robert Koch, in 1882, and the proof that this bacillus was the cause of tuberculosis, changed the established belief that tuberculosis was hereditary to the belief that it must always be acquired. This is of course a most constant fact, but the part that heredity plays in the development of tuberculosis, in furnishing proper ground in which the bacillus may grow, or in offering a condition of low-grade immunity against this disease, is progressively becoming more prominent. A human fetus can be born with tuberculosis, but comparatively few such cases have been recorded. If one were roughly to estimate the number of such authentic instances it might not be far from one hundred, and in most of these the mother was the tuberculous parent.

Tubercle bacilli have rarely been found in the milk of an infected mother. Therefore, direct infection from this source is improbable. It is possible, however, that toxins from the tubercle bacillus or from a secondary infection of the mother may be eliminated in the milk and cause, in the child, gastro-intestinal disturbance, fever and emaciation. It is improbable that the milk could furnish any substance that would render the child immune to tuberculosis. The therapeutic conclusion is positive that a tuberculous mother should not nurse her child, not only for the child's

sake, but also for her own, as the mother rapidly grows worse through the nutritional loss caused in producing the milk.

Statistics show that the person who is underweight and has a family history of tuberculosis is more likely to develop the disease than one who is underweight without a family history of tuberculosis. On the other hand, a person of full weight or overweight, whatever the family history, while not precluded from the possibility of developing tuberculosis, is much less likely to have it than one who is underweight. Also, one who is underweight is more likely to develop tuberculosis than a person of normal weight. Whether or not, the majority of underweight persons harbor tuberculosis germs and such a condition predisposes to underweight has not been demonstrated, but it is quite possible.

As is apparently true of most germ diseases, a race that has but recently acquired the disease is more susceptible to its inroads, and has the disease more actively than a race that has long suffered from it. Also, a change from outdoor life and a dry, clean air environment to indoor or to city life, or to a region where the air is damp or dust laden, predisposes to the development of tuberculosis.

These bacilli almost invariably gain entrance to the system by one of two ways: by inhalation, or by swallowing. A germ that is so constantly present in almost every community of civilized peoples must be breathed and swallowed by most persons. Something in the individual must tend to kill these germs before they acquire a home, that is, before they congregate in sufficient numbers to perpetuate themselves. Nothing probably tends more to prevent the acquirement of this disease than general good health, which especially means health of the upper-air-passages and throat, the absence of bronchial catarrh, healthy tonsils, a normal digestion and healthy intestines. The tubercle bacillus probably cannot find a living chance unless there is some disease, injury or chronic disturbance in one of the parts of the body mentioned, and unless a sufficiently large number of them are inhaled or swallowed at once, so as almost to overwhelm the person's ability to destroy the germ. Of course, it is possible and perhaps probable that, although this disease gives no

immunity, a patient in whom the disease has been arrested or in whom the disease once active is now chronic or more or less latent, may produce, or have already circulating in the body-fluids, enzymes that may destroy the tubercle bacillus more readily than is possible in one who has never had the disease.

Perhaps many conditions that we have termed causes predisposing to tuberculosis may really stimulate to activity latent tuberculosis or a tuberculous focus harbored and concealed somewhere in the patient's body. Whichever of these two suppositions may be correct, we recognize that a patient is likely to acquire, or having acquired, at least may develop an active tuberculous process when he is anemic; when he is under weight; when he is continuously overfatigued; when he has a tendency to recurrent colds, especially to recurrent bronchitis; when he does not quickly recuperate from any simple acute infection, whether it be grip, measles or whooping-cough, etc., or when he has suffered from a more serious acute infection, such as some prolonged septic process or typhoid fever, and especially when he does not recover quickly from a pneumonia or a pleurisy with effusion. Pleuritic effusions are considered as perhaps generally tuberculous in origin. None of the surrounding predisposing causes, such as unsatisfactory housing and occupations that are dangerously dusty, need to be considered here.

A child is considered predisposed to the development of tuberculosis, or perhaps already has a latent tuberculosis, if he is pale, has a tendency to eczemas, or has enlarged tonsils or postnasal adenoids, and especially if he has enlarged cervical glands. Caries of the teeth is also perhaps a predisposing cause, as decayed teeth may harbor all kinds of germs. Therefore to allow caries of a child's first teeth to persist, because they will soon be lost with the eruption of the second teeth, constitutes serious neglect. An enlarged cervical gland probably always shows that an infection entering through the tonsil has invaded the next fortress of protection, namely, the cervical glands. If the infection is tuberculosis, the gland may be actively tuberculous, and evident tuberculous adenitis is the condition. Much more frequent and not evident, but

often found by good roentgenograms of the chests of children, is the involvement of the bronchial glands by the tuberculous germ having perhaps first gained entrance through the tonsils, and this without any involvement of the cervical glands. In fact, it has been repeatedly demonstrated that perhaps the majority of children affected with tuberculosis have the initial lesion in the tracheobronchial and hilus glands.

The bovine tuberculosis is frequently transmitted to children through milk by way of the intestine has for some years been thoroughly established, and it has been shown that many instances of glandular tuberculosis are due to this type of bacillus. General tuberculosis rarely, but udder tuberculosis almost always, infects milk with tubercle bacilli. The frequency with which bovine-tuberculosis-infected milk causes tuberculosis in children is still more or less a subject of dispute. Many experiments have shown that the gastric juice does not necessarily, if ever, kill the tubercle bacillus.

MEASURES THAT WILL CAUSE A DECREASE IN THE INCIDENCE OF THIS DISEASE

These may be enumerated as, primarily:

1. General instruction in hygiene and in the conditions that predispose to this disease.
2. Tenement-house laws to prevent overcrowding.
3. Sunlight.
4. Open windows, verandas and roof-gardens.
5. Municipal breathing-spaces; parks, playgrounds, etc.
6. Proper ventilation of all churches, theaters, halls and assembly rooms.
7. Open-air schools, or open-window schools.
8. Laws prohibiting spitting on the streets and in buildings.
9. Better factory sanitation; better methods of cleaning public buildings and public conveyances.
10. Special laws against the dissemination of dust in factories, foundries and all occupations in which it may be inhaled.
11. Better hygiene and improved buildings for all general hospitals, prisons and jails.

12. Better laws for the more scientific control of tuberculous cattle, and compulsory cleaning and improving of cow-barns and farms used for producing public milk-supplies.

13. Certification or pasteurization of all milk used for infant-feeding.

Personal preventive measures are :

1. Compulsory report of every case of tuberculosis.

2. Careful instruction of the family in the care of the tuberculous person, if he is to remain at home.

3. Careful personal instruction of the patient, if he is at an age to receive it, as to the possible methods of communicating the disease to others.

4. Sanatoriums for incipient cases of pulmonary tuberculosis.

5. Isolation hospitals for advanced tuberculosis patients whose home surroundings are inadequate.

6. Skilled dispensary care of ambulatory cases and visiting nurses for "follow-up" work.

7. Sanatoriums or rest-hospitals for joint and bone tuberculosis; these are of special value when located at the seaside. (The value in glandular tuberculosis of seaside sanatorium or veranda rest-cures should also be recognized.)

8. Careful instruction to reduce the morbid fear of other members of the family, and for the mental comfort and happiness of the patient. This should be given, both by the board of health and by the attending physician, to the effect that the disease is not contagious, and that if the instructions urged are properly carried out the probability of acquiring the disease from the patient is practically nil.

PRETUBERCULOUS SYMPTOMS

The earlier we recognize the signs of probable or even possible tuberculosis, the better, as prevention is far easier than cure, though a cure is probable all through the first and second stages, and possible even in the third stage of the disease.

The conditions which predispose to this disease have already been enumerated. Besides correcting these conditions, we should use every means to build up the general system by tonics, outdoor life, change of clim-

ate, and by proper tepid or cold water sponging in the morning which causes the skin so to react that colds are not readily acquired.

At a very early stage there may be no lung signs, and it may be impossible to determine whether or not the bronchial lymph-nodes are enlarged or diseased. There are loss of weight, more or less gastric disturbance, pallor, lassitude and vasomotor disturbances shown by cold hands and feet; or the latter may be intermittently very hot and dry. There is generally a history of progressive loss of weight, irregular chest pains, shallow breathing, dry cough, especially on deep inspiration, and, most important symptom of all, an afternoon or evening rise of temperature, not explainable by any tangible cause (although it must not be forgotten that occasionally such a temperature can be of nervous origin). Gastric indigestion, with loss of appetite, is often an early symptom of pulmonary tuberculosis. An anal fistula is generally secondary, and is not often primary to the lung lesion, and the discharge from it may contain tubercle bacilli, as well as staphylococci and streptococci. There may be some other chronic suppuration present, as a middle-ear catarrh. While anemia is generally an early symptom, in the early stages there may be an increase in the number of the red blood-corpuscles. Amenorrhea, even without anemia, in girls and women is generally an early symptom; but women can complete one, or even two pregnancies while tuberculous.

While we are studying every symptom, and the lung symptoms are so few, to ascertain whether the patient really is tuberculous, a personal history of much sickness, especially colds, enlarged glands, chronic joint and tendon swellings or recurrent diarrheas, even if there has been no actual pulmonary consumption in the immediate family, renders the tendency, and hence probability of tuberculous infection, much greater. Stiller's *Habitus Enteroptoticus* is probably due to a tuberculous infection.

In making the physical examination it should be remembered that it has long been decided that the flat, broad chest, contrary to previous belief, is less likely to be tuberculous than the rounded, barrel-shaped chest. Also, the chest circumference in the nipple line should

measure anatomically half the height of the person. The expansion, unless the patient is abdominally obese, should be from 3 to 4 inches; $2\frac{1}{2}$ inches is too small an expansion for a young adult. The inspection of the chest may show a lagging of one side during expansion, which may, however, be most noticeable with the finger-tips placed under the clavicles. This sign is very suggestive. The typical impaired percussion-note, imperfect breeziness of the inspiratory murmur, lessened depth, slight jerky inspiration, slightly prolonged, expiration, slightly increased vocal resonance and localized râles, either dry or moist, with increased muscle resistance over a diseased area, with pleuritic pains in the upper part of the chest or between the shoulder-blades, are all too well understood to require elaboration. Very suggestive is the axillary, dripping perspiration during examination. Also suggestive is the little dry cough during the required increased inspiratory effort. This dry cough, hardly noticed by the patient, has probably been observed for weeks, if not longer, by the patient's family.

A study of the temperature of the suspected person is important; the temperature should be taken every three hours during the day for several days, or at least at 8 o'clock in the morning, at 4 in the afternoon, and at 8 in the evening, if not more frequently. A recurrent rise of temperature in the afternoon or evening, without any assignable cause, is almost pathognomonic of a latent tuberculosis becoming active. Some patients who show no temperature at rest will have quite a rise of temperature on the least exercise. Temperatures taken under the tongue are not so accurate as when properly taken in the axilla. Many a patient whose temperature is normal by the mouth will be found to have a higher temperature in the axilla. Of course, the most accurate is the rectal temperature, but this is rarely necessary for the diagnosis. An increased pulse-rate, over a hundred, with or without rise of temperature, is very suggestive, and if the pulse-rate is higher than the temperature would call for, the likelihood of tuberculosis is increased.

A slight hemorrhage of arterial blood always causes the laity to suspect phthisis, and the suspicion is quite generally correct. Hemorrhages can occur from

the blood-vessels of the throat and larynx, although they are generally very small in amount, and most frequently venous, and many a patient has been condemned to treatment for tuberculosis on account of a perfectly simple throat hemorrhage.

The occurrence of typical night sweats, that is, cold sweats toward morning, is a frequent and suggestive symptom of tuberculosis; but patients who have been weakened by illness, overwork, or overexertion may have this symptom for a short time, although it should always create suspicion.

A rarely noted symptom of tuberculosis, which may occur early in the disease or not until later, is atrophy of the mammary gland on the affected side; also, the hand and foot may be colder on the side affected, or if they are hot and dry, may be warmer than on the other side of the body. Conjunctivitis, blepharitis and an inequality of pupils, with dilatation of the pupil on the same side as the affected lung, have been noted. The skin of the tuberculous patient is often dry, and may be rough and sallow; there may be increased pigmentation, especially around the nipple on the diseased side, and there may be chloasmic spots. Bright-red spots on the cheeks, and the glistening eyes occurring in the late afternoon, with the hands dry and hot, are almost pathognomonic. At other times of the day there is pallor, with the veins prominent all over the body; the face looks sad, and there is languor and a rapid, collapsing pulse. These are all signs that may occur at an early period.

Before deciding that the sputum of a suspected patient, or a patient who has incipient tuberculosis, is free from tubercle bacilli, several examinations must be made. The sputum may be found free from bacilli on several days, and then on the last day of the examination found to be loaded with them. The number of bacilli found has no great bearing on the prognosis of the disease. On the other hand, if large numbers of tubercle bacilli continue to be present after considerable periods, probably cavitation is either present or developing. The prognosis can hardly be made from the character or appearance of the tubercle bacilli, although it has been thought that large numbers of the

smaller tubercle bacilli show greater activity of the disease.

A fluoroscopic examination of the chest will often reveal, even before clouding of any portion of the lung occurs, a diminished excursion of the diaphragm on the affected side. This is very suggestive of tuberculosis. Roentgenograms may show areas of beginning lung trouble as well as diseased bronchial glands. Besides the skin tuberculin tests, the conjunctival test and the interdermal test, all of which are more or less reliable, a positive diagnosis can generally be made by injecting the original tuberculin subcutaneously.

A number of substances can produce a reaction in tuberculous patients similar to that from tuberculin. Nucleoproteins, cinnamic acid and some alkaloids can do this.

The tuberculin used in making the test for tuberculosis is a purified extract prepared from tubercle bacilli. The details of its preparation need not be described here. Its injection causes a leukocytosis and stimulates the production of ferments, especially in the cells and tissues immediately surrounding the tubercles. These ferments then act on the poisons that have been produced by the tubercle bacilli and have accumulated in the tubercles.

The fever reaction is due to the toxins set free from the tubercles and to the action of the enzymes on these toxins. If some form of tuberculin is used for curative purposes, the reactions will become less and less, as more of these sealed-in toxins are set free. Also, reaction may be less as the system becomes less sensitive and hence immune to the irritation of these toxins. It can readily be seen that if too large doses of tuberculin are administered, either as a diagnostic test or as a curative treatment, such a large amount of these toxins might be liberated as to cause an intense fever reaction, to the disadvantage of the patient. Also, it is quite possible by such treatment to liberate live tubercle bacilli and cause general infection. Hence the greatest possible care should be exercised in using tuberculin, either as a test or as a treatment, and the first doses should be of minimum amounts.

As tubercle bacilli are not readily killed by leukocytes, the latter surround the mass of bacilli and disin-

tegrating and caseous material; the resulting lesion is called a tubercle. The fight, then, of enzymes and toxins goes on between the two opposing factions. Some of the leukocytes and some of the bacteria die, with the production of toxins and enzymes. If these are liberated by the local inflammatory process the fever reaction and the other concomitant symptoms occur in the person if sufficient amount of the toxin circulates in the blood. Every tubercle that breaks down and is evacuated into the bronchial tubes and expectorated, is a step toward recovery. This satisfactory process, however, cannot go on without a general disturbance of the patient, with loss of appetite, loss of weight and emaciation, and it becomes a question whether the person can stand the disease until the tubercles are evacuated, and whether or not such evacuation will produce cavitation. The object of a tuberculin treatment is to aid the patient slowly to eliminate his tubercles when the disease in him has come to a standstill, and he shows no tendency to recovery, even if he is not growing worse. The theoretical object, then, aimed at by treatment is the elimination by the patient of most of the tubercles, or the permanent encapsulation of those not eliminated by such fibrous and calcareous material as will cause them to be forever outside of the body, as far as any relationship to the blood and lymphatic circulation is concerned. On the other hand, if too many tubercles are broken down at once, too persistently or too continuously, the prognosis is bad, and tuberculin is ordinarily not indicated.

Our conclusions as to the subcutaneous tuberculin test may be as follows: 1. It is a reliable test, and is pathognomonic in children and young adults. In older adults, if the test is positive, it may be relied on as showing a tuberculous focus somewhere, but if the test is negative it is not so reliable as in children. 2. It should not be used carelessly, though perfectly safe if the beginning dose is small. 3. The tuberculin test is unnecessary when a localized pulmonary lesion has been discovered by physical examination. 4. When we recognize that a patient is tuberculous or is liable to become so, although we find no physical lesions, the tuberculin test is unnecessary, as our preventive

treatment should be the same whether reaction is positive or negative. 5. In doubtful bone, tendon or joint inflammations, or when for any reason a decision must positively be made, the tuberculin test should be used.

Although a reaction from tuberculin has occurred in cases of carcinoma, syphilis and actinomycosis, still, these instances are so rare that there is the probability that such patients had a latent tuberculosis, and hence the test may be considered positive. In advanced cases of tuberculosis, however, the test may be negative on account of a tolerance to the toxins already described.

The beginning dose of "old tuberculin" for diagnostic injection is 0.1 mg., the second dose should be 1 mg., the third may be 3 mg. and the fourth 5 or 6 mg. Of course, a reaction occurring with any dilution would prevent the necessity or advisability of giving another injection. A suspected patient not reacting to 5 or 6 mg. should be considered free from tuberculosis.

If a physician desires, he may receive direct from the serum and bacterin firms the "old tuberculin" properly diluted for the diagnostic test.

Tuberculin triturates and tuberculin vaccines have been administered by the mouth as a possible treatment of tuberculosis, but such administration is as yet purely experimental.

The tuberculin injection test should be used only with a patient who is at rest and does not have a morning rise of temperature as shown by a series of observations. The injection should be given at about 9 p. m., and if there is a rise of temperature in the early morning, it should be considered a positive reaction, and if there is pain, swelling or heat discovered at an external suspected area, as a joint, or if there is congestion or moist râles are discovered in a suspected area of lung-tissue there is a "focal reaction." If there is a marked reaction at the region of the injection (the "local reaction"), even if there is no general reaction, the patient probably has tuberculosis, and it may often be unnecessary to continue the injection of higher dilutions.

The "intradermal" tuberculin test for the diagnosis of latent or concealed tuberculosis (first described by Mantoux and Hutinel, *Bull. de l'Acad. de mèd.*, Paris, Oct. 27, 1908), has been recently revived and recom-

mended by Jeanneret. (*Rev. Méd. de la suisse romande*, 1913, No. 5, p. 373). The advantage of this test over the von Pirquet and the Moro skin tests is that a known amount of tuberculin is injected between the layers of the skin. The reaction is a local one, and there is no general disturbance like that occurring with the subcutaneous tuberculin test.

Another diagnostic test is the determination of the presence of albumin, and its amount, in sputum. Albumin is generally present in all sputa of tuberculous origin, and it has been said that persistent absence of albumin from sputa shows that its source is non-tuberculous. Albumin is also present in sputa of bronchitis, pneumonia and other conditions. For a discussion of this subject and a simple method of making the test see article by Holm and Himmelberger (*Jour. A. M. A.*, Jan. 3, 1914, p. 20).

GENERAL MEDICATION IN THE TREATMENT OF TUBERCULOSIS

In the first place, drugs, as such, cannot cure, and are not antidotes to this disease. On the other hand, much can be done, with proper medication, to aid the physiologic processes.

Calcium.—It has long been thought that patients suffering from tuberculosis have previously become demineralized. This means especially that they have lost their calcium, and perhaps phosphorus, equilibrium. It is also true that tuberculous lesions heal by more or less calcification. Also, patients are more likely to have hemorrhages, if their calcium blood-content is diminished. Certain it is that patients, especially children, often improve with increased amounts of calcium in their food or as a medicament. One of the great values of a proper amount of milk for tuberculous patients is probably the calcium and phosphate content. On the other hand, many patients improve by the administration of a calcium salt, and none is better than calcium glycerophosphate, in 0.30-gm. (5 grain) doses, three times a day, after meals.

Galliot (*Arch. de mèd. d. enf.*, 1913, XVI p. 289) advises the following combination for children who are suffering from tuberculosis: calcium carbonate and

calcium phosphate, each from 20 to 30 cg. (from 3 to 5 grains); magnesium chlorid from 10 to 20 cg. (from $1\frac{1}{2}$ to 3 grains); magnesium oxid from 5 to 10 cg. (from about $\frac{3}{4}$ to $1\frac{1}{2}$ grains). This he administers two or three times a day. It has often been found that tuberculous patients improve under the administration of thymus gland. This is rich in nucleoproteins, and therefore offers phosphorus in assimilable form, and also it seems to promote the calcium metabolism. This gland is very active during childhood, when the greatest amount of bone growth occurs.

Creosote.—Creosote has been long recommended and much used, and its action in tuberculosis has been lauded by able medical men.

There is a great difference of opinion among clinicians as to the value of creosote in pulmonary tuberculosis. Many physicians never use it in this disease, and others push it to such an extent that the patient is practically saturated with it, and his room and almost the whole house reeks with the odor of creosote. It seems to be true that many patients have improved appetite under its stimulant or irritant action in the stomach. It may also, for a time, improve digestion, and the patient often adds weight. During this period there is frequently a lessening of the bronchitis, and therefore a decreased expectoration, and with this decrease of the secondary (streptococcic) infection, there is likely to be less fever and therefore less sweating. It is so rare, however, for a patient to take creosote and not adopt the rest cure and other measures that go toward improving his condition, that it is not fair to attribute such improvement to the creosote. Creosote is also more or less of an intestinal antiseptic, and hence bacteria-laden sputum that may be inadvertently swallowed may be rendered harmless in the upper part of the intestine. Be that as it may, it is a fact that good bowel activity, an improvement in the intestinal digestion, and the prevention of fermentation or putrefaction in the intestine, by many so-called bowel antiseptics, will all cause an improvement in the tuberculous patient.

Unfortunately, as frequent aftermaths of the good action of creosote the pancreas becomes overstimu-

lated by the drug and does not furnish its secretion properly; there is intestinal indigestion; the liver is disturbed; there are stomach indigestion and loss of appetite, and the patient will lose weight faster than he gained it under the creosote treatment. Too much creosote will also irritate the kidneys, and may cause albuminuria. In other words, it generally does not seem wise to recommend creosote, as such, internally in pulmonary tuberculosis. As an ingredient of an inhalant mixture it may be of value, as a positive antiseptic to the upper air-passages and the trachea and large bronchial tubes. If there is fetid, purulent expectoration, such inhalations may be of advantage.

Guaiacol frequently in the form of a benzoate of guaiacol has been used for tuberculosis, but guaiacol has no advantage over creosote in the treatment of tuberculosis. The exponents of the creosote treatment believe that the drug should be begun in small doses and gradually increased to the point of the patient's tolerance. Tolerance means that the appetite is not interfered with, that there is no nausea or vomiting, and that the urine does not become dark and show albumin.

The symptoms of creosote poisoning are similar to phenol poisoning. From its overaction the patient not only has gastritis and intestinal disturbances, but also dark urine, perhaps nephritis, and dizziness and sweating.

Ichthyol.—The internal administration of ichthyol in tuberculosis seems to have its only advantage in acting as a bowel antiseptic. In this manner it may do some good, but as patients generally eructate it, it is exceedingly unpleasant treatment. Other methods of preventing intestinal disturbances, such as ordinary laxatives, a cathartic perhaps once a week, the administration of soured milk, yeast or lactic acid bacilli, if any such treatments are indicated, or salol if needed, are all better than the ichthyol.

Cod-Liver Oil.—This oil is a food, and as such has its advantages. A small dose of cod-liver oil is as easily taken as a large dose of some emulsion which contains but little of the oil. In other words, if one desires to give cod-liver oil, it may be given; but, as

previously stated, other oils and fats are of as much advantage, particularly butter, and it certainly is not wise to load the system with large amounts of bile-salts. There is no difference in the effect of Norwegian cod-liver oil and the oil prepared on our own shores.

The Hypophosphites.—There is no chemical, physiologic or specific excuse for giving the hypophosphites; the success of treatment of lung conditions with hypophosphites is a fallacy. It is not intended to state that some phosphorus and some calcium-bearing preparations and foods containing these elements may not be of value, but one is not justified in expecting results from any hypophosphite combination of these or other elements.

Arsenic.—Arsenic has been advised for years in many lung conditions. It has been stated that the arsenic eaters of France and Switzerland have been more or less immune from tuberculosis. It has been stated that patients breathe more freely and better under the influence of arsenic. However this may be, in the treatment of pulmonary tuberculosis the value of arsenic is very slight. It seems to stimulate the production of blood-corpuscles, both red and white, and in small doses it may stimulate the appetite. In any large doses arsenic is harmful, tending to cause secondary destruction of red blood-corpuscles, to irritate the kidneys, to upset the digestion, and when pushed, may cause multiple neuritis. In other words, arsenic is a poison, and should not be administered to a patient unless there is a tangible, positive indication. Arsenic has come more or less into prominence as a germicide since the wonderful activity shown by salvarsan in the treatment of syphilis. It has long been known that arsenic may sometimes kill the malarial germ; it seems also to have some activity in certain tropical germ diseases. But arsenic is such a stimulant to glandular tissue, especially to the lymph-nodes, that it would seem unwise, theoretically, to give a sufficient amount of it to cause excessive activity of these glands, with the probable pouring out of many tubercle bacilli into the lymph and blood-streams. In

good-sized doses arsenic could probably do harm just as large doses of tuberculin will do harm.

Iodin.—For many years this element in some form has been given frequently for various kinds of tuberculosis, especially glandular tuberculosis. It was recently lauded for pulmonary tuberculosis by Boudreau. (*Abstr. Jour. A. M. A.*, Feb. 14, 1914, p. 577.) He gives the French tincture (1 part of iodine to 12 parts of 90 per cent. alcohol), and commencing with small doses runs it up to 100 drops a day, administered in various beverages. After ten years of trial, he finds such treatment of value not only in pulmonary tuberculosis, but also in renal tuberculosis.

Although there are no other reports concerning this treatment, harm has been done in pulmonary tuberculosis by the administration of an iodid. It seems to be a stimulant to the tubercles, not unlike tuberculin, and may cause a lighting up of a quiescent tuberculous process or a serious exacerbation of a slow-going infection. The stimulant action on glands is well known, and tuberculous glands may be overstimulated to the harm of the patient. In other words, iodids should not be used carelessly in pulmonary and glandular tuberculosis. This does not militate against the possibility of small, very slowly increasing doses of iodine doing the same good that graded doses of tuberculin do, but the treatment should be most carefully watched.

Thyroid gland substance has been given in tuberculosis, but it is rarely indicated, though the thyroid is probably often affected in tuberculosis.

Though the syrup of the iodid of iron has long been given in glandular enlargements in children, experienced observers have found no greater benefit from it than from some other form of iron.

Tuberculin.—Tuberculin is not holding the position which was accorded to it after its recovery from the depression due to its early incautious use. It is not in itself curative, but it is, at most, a stimulant to the curative efforts of the organism. Some observers are still of the opinion that it is of value in selected cases of tuberculosis. The potency of tuberculin for harm is recognized by all. Its administration requires careful selection of the case, close observation of the

patient and appropriate regulation of the dose. Patients should be treated in a hospital, or, if the remedy is administered to ambulant patients, a strict control should be exercised. Tuberculin is effective only in strictly localized forms of tuberculosis. Hence, the results are good in the forms of tuberculosis called surgical, such as affect the skin, bones, joints and lymph-nodes. Tuberculosis of the lungs, when strictly localized, would appear to indicate its use, but the different character of the tissue involved seems to render the results less favorable.

Heliotherapy.—Treatment by the direct rays of the sun has been applied to a limited extent by Rollier of Leysin, especially in cases of pulmonary tuberculosis complicated by local tuberculosis of the bones, joints or glands. It is seldom used in ordinary cases of pulmonary tuberculosis. It should be limited to incipient cases and applied with caution, where, there is fever or a tendency to hemoptysis. The treatment is best carried out in connection with the tonic application of cold at high altitude. It consists in graduated exposure of the body to the light of the sun for increasing periods daily until the resistance developed permits a long stay in the open air. The treatment is said to be well borne by children. During the treatment the head should be protected and the room should be comfortable for the patient.

TREATMENT OF SYMPTOMS

Fever.—Nothing tends to diminish the temperature more than the rest, quiet and fresh-air treatment already outlined. The patient who has high fever should not be given too much food at any time of day, even if the disease is tuberculosis; and most of what he does receive should be given during an afebrile period if possible. If he is suffering from acute tuberculosis, the nutrition should be much the same as for any other serious fever.

Sponging with hot water will often give these patients comfort, and, if they have profuse sweats, it keeps the skin clean. The frequency of such sponging will, of course, depend on the height of temperature and its continuance. Antipyretics are rarely indicated.

The following points should be observed in the treatment of fever: First and foremost, absolute rest in bed, preferably out of doors; artificial pneumothorax in selected cases; a trial with autogenous vaccines, especially when there is copious purulent expectoration; the cautious use, if at all, of tuberculin, and then only after other measures have failed; hydrotherapeutic measures suited to the condition and comfort of the patient; and ample diet, but not necessarily "forced feeding," and the judicious use of medicinal antipyretics.

Cough.—The treatment of the cough depends on whether it is dry or moist, and whether expectoration is easy or difficult. If the cough is dry and hacking, much of it may be prevented by the will-power of the patient. It should not be forgotten that many dry, irritating coughs are due to a lingual tonsil or throat irritation. Soothing, alkaline gargles, non-irritating inhalations of simple steam or steam medicated with some non-irritant drug, as a small amount of pine oil, will give relief. Many coughs of this kind are relieved by swabbing the lingual tonsil with boroglycerid. These dry, irritating coughs should be relieved without giving medicine by the stomach.

If there is considerable bronchitis with insufficient expectoration, or the cough is frequent without expectoration, no cough mixture is any more soothing or behaves better in the stomach than the following:

| | Gm. or c.c. | |
|---------------------------|-------------|--------|
| R Codeinae sulphatis..... | 20 | gr. iv |
| Ammonii chloridi..... | 5 | ʒ iss |
| Syrupi acidi citrici..... | 25 | ʒ i |
| Aquae .....q. s. ad | 100 | ʒ iv |

M. Sig.: A teaspoonful, in plenty of water, every two, three or four hours, as needed.

Heroin may be used in place of codein if desired, but we believe that codein is the best sedative preparation of the opium series to meet the indication. The action of all other expectorants is inferior to that of ammonium chlorid, and ammonium chlorid as prescribed above is not very disagreeable. The dose may be taken in Vichy or other sparkling water if desired. None of the multiple sweet, sickish, syrupy preparations offered

by proprietary firms should be used in the bronchitis and catarrh of tuberculosis, or in any other kind of bronchitis. It is not necessary to cause nausea or vomiting because a patient has a cough. The success of some of these syrups or malt preparations in dry cough is due to the fact that they soothe the throat and lingual tonsil. Such irritation can be allayed without the patient swallowing a mixture. If the cough is loose, and if expectoration is profuse, the stimulating effect of ammonium chlorid and the sedative effect of codein are not needed, and terpin hydrate becomes the best drug to use, as an expectorant. To meet this indication of profuse bronchorrhea it will not ordinarily be necessary to combine it with either codein or heroin. It should never be given in solutions, as not enough of it to be of advantage will be dissolved in any solution. It may be given in tablet, powder or capsule, and the usual dose is 30 cg. (5 grains), given with plenty of water four or five times in twenty-four hours.

If there are cavities in the lungs, the patient should occasionally, by lying over the edge of the bed, allow gravity to aid him in expectorating the fluid and pus. Elevation of the foot of the bed is often of advantage. Sometimes inhalants containing creosote, oil of pine and perhaps benzoin are valuable. When there are large cavities which continue to fill up and cause septic fever, with the debility and loss of appetite that goes with it, or when there is danger of sericus hemorrhage, it may be wise to inject air or nitrogen into the pleural cavity and compress the diseased lung. Such treatment should be given only in hospitals or sanatoriums, and then by an expert, as very unpleasant symptoms may occur; the heart may be unpleasantly pressed on, with a serious outcome. On the other hand, the treatment is sometimes very satisfactory.

Pain.—Pain in the chest is most frequently due to localized pleurisies, but it may be a neuralgia, or referred pain caused by disturbances of the more deeply seated nerves. Nothing is of more advantage in easing such pain than temporary strapping of the part of the chest affected. This is especially true of pain in the lower part of the thorax. Sometimes ?

hot-water bag will ease the pain; rarely a sedative may be indicated, but generally it is not needed. Mild counter-irritation by a liniment or ointment is sometimes advisable over these regions of pain; blisters are rarely expedient, though the thermocautery may be used. Dry cupping may give relief. The pain of tuberculous laryngitis can be relieved by injection directly into the superior laryngeal nerve of alcohol or cocain solution, according to the technic for similar injections for neuralgia or local anesthesia.

Hemoptysis.—Blood-tinged sputum or very slight pulmonary hemorrhages as evidenced by small clots or streaks of blood require no special treatment. Expectoration of pure blood, or coughing up a little blood repeatedly requires attention. Such a patient should rest, and should undergo no exertion. The diet should be light, and hot soups or hot drinks should not be taken for a day or two, until the hemorrhage ceases. For this kind of bleeding little other treatment is necessary. If the bleeding is more severe, the patient should immediately be placed in a semirecumbent position, with loosened clothing and should be assured that there is no danger, as there rarely is danger from hemorrhage during all the early stages of pulmonary tuberculosis. In the late stages, with cavities, a large blood-vessel may rupture and the hemorrhage be fatal. It is well to have the patient lie on the side which is bleeding. This tends to prevent the blood from flowing into the bronchi of the other lung.

Besides reassuring the patient, it is often well, if there is a troublesome, irritating cough, to administer a hypnotic of morphin in just sufficient dose to quiet the irritability of the bronchial tubes and larynx so that the cough will be only sufficient for expectoration. (It is unnecessary to give a large dose which later will cause prostration; hence from 1/10 to 1/8 of a grain will be sufficient.)

The more rest the bleeding part has, the quicker will the blood coagulate in the bleeding vessels, but as above stated, mere capillary oozing should not be taken seriously. With a real hemorrhage from the lungs, the rest must be absolute; the patient should not even speak, at least not above a whisper. For some hours

he should receive no food or drink. It is exceedingly doubtful if an ice-bag over the region of the bleeding is at all efficacious. The long-used remedy of eating salt may reflexly, by irritation, increase the vasomotor tension and thus may occasionally stop a hemorrhage, but most of the remedies used and said to be satisfactory in hemorrhage from the lungs are drugs that increase the blood-pressure more or less, which is undesirable. As the blood-pressure is lowered the hemorrhage will generally cease, usually without medication, so that whatever has been given has been supposed to be the cause of such cessation. If the patient becomes faint, blood-pressure is lowered, coagulation in the open vessel or vessels takes place, and the unpleasant symptoms is cured by Nature's methods; therefore we should aid the natural cure of the condition by giving the patient nitroglycerin to low the blood-pressure. Amyl nitrite is very frequently advised, but its action is so sudden, and for a few minutes so intensely disagreeable, that it is hardly advisable to use this powerful drug. Nitroglycerin on the tongue or hypodermatically will act as efficiently and almost as rapidly without causing the faintness and throbbing head that amyl nitrite will cause. It is a mistake to give ergot, caffein, suprarenal preparations, or digitalis, as these tend to increase the heart activity and raise the blood-pressure.

If there is a tendency to repeated, more or less serious hemorrhages, the daily administration of calcium in some form, either as lime-water, calcium lactate, or calcium glycerophosphate, and the feeding of gelatin are indicated. Also, if there seems to be a general tendency to the oozing of blood and to hemorrhage, injections of aseptic horse-serum is advisable; one or two subcutaneous injections will generally be sufficient. Inhalations of steam impregnated with some astringent such as tannic acid may be of value, if there is oozing of blood from the larger bronchial tubes, but such inhalations are of no value in bleeding from deeper portions of the lungs, as the astringent could not reach the region of trouble.

The patient should generally remain in bed for a week after a real hemorrhage. If the heart is impaired and some dilatation exists, if the expectorated

blood is venous, and there are other signs of passive congestion of the lungs and of cardiac weakness, digitalis may be the best treatment for the condition; but for ordinary hemorrhages in pulmonary tuberculosis it is better, as above stated, to administer nitroglycerin in sufficient amount distinctly to lower the blood-pressure temporarily.

It has been repeatedly noted that constipation increases the tendency to hemorrhage in pulmonary tuberculosis, and that the higher blood-pressure caused by constipation is readily lowered by the administration of even simple laxatives. Because of this, it has been recommended (*Bly, Jour. A. M. A., Dec. 20, 1913, p. 2207*) that when pulmonary hemorrhages occur, the patient should receive a dose of magnesium sulphate as well as nitroglycerin. Such immediate treatment of hemorrhage from the lungs seems hardly advisable. It might cause vomiting, and the mere increased exertion caused by bowel movements at this time, might cause more bleeding. The fact remains, however, that in pulmonary tuberculosis the patient should not be allowed to become very constipated.

If the hemoptysis occurs late in the disease and is dangerous in amount, the patient may quickly succumb, whatever the treatment adopted. The most efficient treatment of this serious condition is to place elastic bandages high up on the legs, or even all the extremities, to shut off their blood from the general circulation. It would be inadvisable, even if the hemorrhage was severe, to transfuse immediately, as anything that raises the blood-pressure will be likely to cause a return of the hemorrhage from the open vessel. Later, after the hemorrhage has ceased and sufficient time for thorough coagulation has passed, the extremities, one at a time, may be released and the blood contained in them allowed to return to the general circulation.

Continued bleeding from the lungs (especially when cavities exist and a serious hemorrhage has taken place, or seems likely to occur) is one of the most important indications for the use of lung compression. Other indications, as previously suggested, are the presence of pus in a cavity in the lungs, and bron-

chiectasis. For either of these conditions lung compression is becoming more and more popular with specialists in tuberculosis. It is also wise, perhaps, to compress a lung when, in spite of some weeks of proper treatment, the disease continues to spread in it, the other lung being normal.

The gases that may be injected into the pleural cavity are nitrogen; oxygen and nitrogen, oxygen and air, or air and nitrogen. If only temporary compression is desirable, air, or a gas rich in oxygen seems indicated, as its absorption is more rapid. If a prolonged compression is desired, nitrogen should, perhaps, be used, as it is less readily absorbed, and therefore the compression is longer continued. A mixture of air and nitrogen is perhaps a good combination when a brief compression is desired, and being more rapidly absorbed than nitrogen, will allow a decision as to the ability of the patient to stand this compression before using the longer compression by nitrogen. It has also been urged that air compression is safer than by nitrogen from the fact that if gas bubbles enter the circulation, the air bubble is more quickly absorbed than the nitrogen bubble. Good technic with proper instruments, however, should preclude such an accident.

If compression is once done and its continuance is desired, more gas should be injected before all of that previously injected is absorbed, as after an injection has once been made, and the pleural surfaces have come together, they become more or less adherent and it is difficult to inject the gas again into this pleural cavity.

Night-Sweats.—This debilitating symptom is very characteristic of tuberculosis, and may occur even without much afternoon or evening fever; generally, however, it follows such increase of temperature. Therefore, the rest and fresh-air treatment that prevents a rise in temperature will also ameliorate or prevent the night-sweats. If, however, typical cold night-sweats occur, nothing in the way of medication more successfully prevents them than atropin, 1/200 to 1/100 of a grain, given dry on the tongue at bedtime. The hydrotherapeutic measures already advised, that

is, the warm water, and later cold water morning spongings are of value as preventives. If the patient is at rest and is getting no exercise, good massage followed by an alcohol rub is an excellent method of stimulating a more healthy circulation in the skin and muscles, and diminishing the tendency to profuse perspiration. The avoidance of constipation, a healthy circulation and good activity of the kidneys, all prevent night-sweats and the accumulation of toxins in the blood. If there is much circulatory weakness, several doses of strychnin sulphate a day, or digitalis, may also prevent night-sweats.

Diarrhea.—Simple diarrhea occurring in tuberculosis patients generally means either that the patient becomes chilled, or that the diet is incorrect. Correction of these conditions will soon stop such diarrhea. Tuberculous diarrhea, i. e., a diarrhea due to tuberculous disease of the intestine is a serious complication not only of pulmonary tuberculosis, but also of any other form. It often occurs in the last stage of the disease. Rest in bed and a carefully selected diet should be the treatment. Whether the diet consists of milk alone, or of a little meat and eggs with milk, should depend on the patient. Generally, vegetables, fruit and even much cereal should be temporarily withheld.

Bismuth subcarbonate may stop the diarrhea, but bismuth should not be long continued. Lime-water may be of benefit. If the kidneys are normal and there is no albuminuria, phenyl salicylate (salol) is good treatment. At times, one of the creosote combinations is valuable. The administration of opium in some form may be necessary before diarrhea can be checked, and in the last stages of tuberculosis diarrhea may not be prevented. Colon washing with warm physiologic saline solutions is sometimes markedly sedative and of value. The bowels should always be kept especially warm, and the patient with diarrhea should not be subjected to intense cold.

Dyspnea.—If the patient is in the last stages of pulmonary tuberculosis and must soon die, there is no excuse for not preventing the air-hunger, and morphin administered in properly selected, small doses, will often relieve the dyspnea. In the very last stages, if

the patient cannot be out of doors to get an increased amount of oxygen, he may be given oxygen inhalations. But oxygen inhalations as a curative procedure are useless and may even do harm.

The Pneumonic Type of Pulmonary Tuberculosis.—Such a condition is likely to occur as a part of acute miliary tuberculosis, but it may develop in a lung as an acute exacerbation of a chronic tuberculosis. The disturbance may be ushered in with a chill, high, irregular temperature, frequent, short cough, considerable dyspnea, at first without physical signs of gross consolidation, but later showing in a part of a lobe, or even the whole lobe, the usual pneumonic signs, even with rusty sputum. The rusty expectoration soon disappears, however, and yellowish, greenish sputum, perhaps blood-streaked and loaded with tubercle bacilli, occurs. The prognosis is very serious, but the acute exacerbation may cease. The treatment is not dissimilar from that of an ordinary pneumonia.

Laryngeal Tuberculosis.—The prognosis of this condition has, up to recent years, been considered very bad indeed, but with more skillful treatment by throat specialists, with the added rest-cure and with tuberculin treatment, many such cases are aborted and the lives of the patients saved. The instances of tuberculosis of the larynx are rare in which, preceding or subsequent to the beginning of the laryngeal disease, some portion of the lungs will not be found affected.

The exact local treatment of a tuberculous larynx depends, of course, on the location of the ulcer or ulcers. If they are so situated that swallowing is very painful, anesthetizing sedatives must be used. Various preparations of silver, lactic acid and menthol are used by different clinicians to aid in healing the ulcers, but the tuberculin treatment, properly used, is probably always advisable. The injection of alcohol or of cocain solution along the course of the superior laryngeal nerve may afford marked relief in this disease.

Tuberculous Peritonitis.—This condition uncomplicated with tuberculosis elsewhere must, of course, be differentiated from many abdominal conditions. If there is fluid, other causes of ascites, as inflammation of the liver, serious cardiac insufficiency and ovarian

cysts must be excluded. Tuberculous peritonitis may appear in several forms: the miliary form which causes ascites, the fibrocaceous, the fibro-adhesive and that which causes tumor-masses. The range of temperature (although in chronic tuberculous peritonitis there may be no increase of temperature, and it may even be subnormal), the localized tumor-masses and fluid confined to one portion of the abdominal cavity by adhesions, will aid in the diagnosis. In tuberculous peritonitis there may be more fluid on the left side of the abdomen than on the right, as the diseased mesentery retracts and draws the bowel to the right. As frequently tuberculosis is not present in other organs, the diagnosis is often difficult, and a tuberculin test is indicated. The fluid in the abdomen in tuberculous peritonitis does not contain pus, unless there is a mixed infection, as the tubercle bacillus does not produce pus. The drawn serum very frequently does not show tubercle bacilli, but a guinea-pig inoculated with the serum will, in due time, develop tuberculosis, if that is the infection from which the patient is suffering. If the exudate found on laparotomy or withdrawn for examination is bloody, it shows the disease is active. Tuberculous peritonitis may originate from infected mesenteric glands. Much false membrane is formed, which causes many adhesions of the intestines.

A patient may apparently be very well and still suffer from tuberculous peritonitis, and the prognosis is rather favorable if such a patient is operated on. It is not advisable to operate for tuberculous peritonitis if tuberculous infiltration is already in the lungs. At times, withdrawal of fluid from the abdomen by aspiration, tonic treatment, rest and the exposure of the abdomen to the rays of the sun will cause a cure. Many sanatoriums are installing the necessary equipment for giving heliotherapy, or sun baths. The direct rays of the sun are thrown on the chest or abdomen. The electrochemical action of the Roentgen ray has also been tried, but its value has not been well proved.

If the ascites tends to recur, or remains, laparotomy should be done, and sunlight let into the abdomen. Laparotomy may cure tuberculous peritonitis when there are simply tuberculous masses or tumors, but no fluid in the abdomen. It has been thought that small

doses of mercury administered for a long period, especially in the form of corrosive sublimate, was of advantage in tuberculous peritonitis.

The results of operation may be summed up about as follows: There is slight danger from the operation itself. Temporary improvement may almost always be expected. Fatal cases usually terminate in a few months after the operation; while not far from one-third of all cases seem to recover in about one to two years after the operation. Antiseptic injections or continuous drainage after operation are not indicated and are useless.

Tuberculosis of the Genito-Urinary Tract.—Tuberculosis of the bladder and prostate is rarely primary, and often has gonorrhea as an antecedent. Tuberculosis of the testicle is by no means infrequent. Removal of the testicle is of course advisable, and operative interference in the bladder and prostate may be indicated. A tuberculous kidney should be removed as soon as it is diagnosed provided the other kidney is normal. The general treatment is the same as in all tuberculosis.

Tuberculosis of the Cervical Glands.—Although this subject has already been quite largely discussed, it should be urged that while surgical removal is necessary and very frequently indicated, every gland that is needlessly removed weakens by just so much the ability of the system to protect itself against all infections. Roentgen-ray treatment, while lauded by some men, seems unsatisfactory to many clinicians. While infected or broken-down glands are being removed, the dissection should be very carefully done, lest the surrounding parts be infected with liberated germs, or if not locally infected, lest the bacilli be absorbed into the lymph circulation and cause general infection.

While a gland should not be removed merely because it is enlarged, at the same time it is a serious mistake to allow enlarged glands to cause such inflammation of the surrounding tissues as to render it necessary to remove parts of muscles, to say nothing of the danger of such chronic inflammation necessitating, during operation, injury to important blood-vessels and nerves. Glands should be removed before they cause injury to the patient or the surrounding tissues.

The tuberculin treatment of tuberculosis of the glands, especially in children, is now much in vogue, and if the tuberculin is used in carefully graded doses the results seem to be satisfactory. Caseated glands should be eradicated or curetted, however, as the tuberculin treatment will not cause resorption. Also, the exact value of the tuberculin treatment for tuberculous glands cannot be determined, as fresh air, good food, iron tonics, and medical supervision are active aids in the cure of this condition. Too large doses of tuberculin may overstimulate the diseased glands and cause general infection. Also, one does not know how many concealed diseased bronchial glands will be stimulated by the tuberculin injections; hence a very careful study of focal reaction should be made throughout the treatment. Bier's hyperemic treatment is probably inexcusable.

Bone and Joint Tuberculosis.—In tuberculosis of these parts of the body, according to Fiske, there may be a slight leukocytosis of not far from 12,000, while in osteomyelitis the leukocytosis is generally not far from 16,000. Children who have bone tuberculosis frequently do well at sanatoriums or in hospitals especially arranged for their out-door or veranda treatment. They do especially well at the seashore, and direct sunshine makes a valuable addition to the treatment of this kind of tuberculosis. Tuberculosis of the glands and bone and joint tuberculosis do especially well under treatment by sun baths, both general and local, in combination with the invigorating effects of cold at moderately high altitudes. Rollier of Leysin and other practitioners at sanatoria in the Alps and at a few places in the United States have secured particularly good results by this form of treatment. Such treatment can be given at home by the institution of simple arrangements at first in the patient's room, later on a veranda and finally when the surgical condition will permit, by free movement in the open air.

Tuberculous Meningitis. — Tuberculous meningitis, sometimes called basilar meningitis, or water on the brain, may be a part of acute miliary tuberculosis, but it frequently occurs in children without other apparent tuberculosis, though careful necropsies in children

dying of this disease may show signs of tuberculosis in the lungs. Tuberculous meningitis is generally a disease of childhood, occurring most frequently between the ages of 2 and 5. Measles and whooping-cough seem to be predisposing causes, simply because they irritate already infected glands, and these glands then pour out tubercle bacilli which causes a local acute infection. Tuberculous meningitis may also follow, in rare instances, a bone tuberculosis.

Enough cases are now on record to show that recovery from tuberculous meningitis is possible, so that the prognosis is not absolutely hopeless, although very dire. The little patient should be kept very quiet, and in a darkened room, and lumbar puncture should be done for relief of any symptoms of pressure, as well as for diagnostic purposes. If the child is suffering pain, codein or some form of opium should be administered, on doses found sufficient for the individual, but not large enough nor so frequently repeated as to produce coma; that is, if coma occurs it should be known that it is caused by the disease and not by the drug. The little patient should not be compelled to suffer severe pain. If food is refused, forced feeding may be advisable, but if the child is thirsty he will generally drink milk. The value of hexamethylenamin is still doubtful. It has for the last few years been thought to be a most valuable treatment in all infections of the meninges or adjacent parts, as the middle ear, etc., and in colds and sinus disturbances. Late investigations, however, show that this drug does not give up its formaldehyd radical except in such acid mediums as are found in the bladder. The drug in ordinary doses, with the kidneys intact, is harmless, however, and should be given until it is certain that it is of no value.

Acute Miliary Tuberculosis.—This occurs in several forms; one in which all the organs of the body are attacked, others in which only certain organs are diseased. In another form the tubercles may be larger and show degeneration. The disease is always serious, generally fatal, and clinically occurs as the meningeal form just described or as a general acute bronchopneumonia of both lungs, or as the typhoid type. In the

lung form the sputum is loaded with tubercle bacilli and the diagnosis is readily made. In the typhoid form there may be no cough, and no real lung signs, although lesions may be found in the lungs on necropsy. It may be difficult at first to distinguish this form from typhoid fever, but the temperature is likely to be very high in the evening with considerable of a drop in the morning, and profuse sweatings. Such morning remissions occur early in the disease as distinguished from typhoid fever. The pain and tenderness in the abdomen, and the joint and cerebral symptoms, will soon make the diagnosis positive. Diarrhea generally does not occur with acute miliary tuberculosis; in fact, the patient is generally constipated—another symptom different from most cases of typhoid fever.

The treatment is similar to that of any acute infection with the exception that great care should be exercised to sterilize every excretion from the body.

Tuberculous Rheumatism.—Poncet and others have described cases of pain and swelling of the joints due either to the circulation of tuberculous toxins in the blood or to the presence of a small number of tubercle bacilli in the affected joints. It is probable that a considerable number of cases of ordinary rheumatism are due to tuberculosis. An almost positive sign of such cases is the occurrence of focal reactions, (pain and swelling) in the joints after injection of old tuberculin subcutaneously.

PROGNOSIS

In the first place, as to the probability of cure of tuberculosis, it should be remembered that statistics of necropsies show that from 30 to 35 per cent. of patients who have died from causes other than tuberculosis show evidence of that disease, either healed or latent. In general, the prognosis of pulmonary tuberculosis is modified by the family history, by the causes which have allowed the tuberculosis to develop, by the whole general condition of the patient, and by the amount of lung-tissue involved. A tuberculous process that begins in the lower part of the lung, following a pneumonia, gives a bad prognosis. A generally debilitated and anemic condition will necessarily slow or

preclude a cure. An associated laryngeal or intestinal complication makes the prognosis very serious.

When a patient is first seen, the prognosis should be guarded, as it is only after weeks or months that the decision can be made as to how much this patient may improve, for even a person who looks otherwise well, except for the fact that tuberculosis is discovered, may develop an acute form of the disease. The physician should individualize the patient, not only as to his surroundings and his occupation, but also as to his mentality. His disposition should be studied. It is a mistake to send a patient to a sanatorium who will be restless under sanatorium restrictions, or who will be so seriously homesick as to lose his appetite, or who will not at all obey instructions. Therefore, the mentality, the individuality and the willingness to cooperate of the patient is of great importance in the prognosis. On the other hand, even a child from 1 to 2 years of age who becomes tuberculous need not necessarily die of the disease. It is possible for children seriously affected with more or less general tuberculosis to recover. It is stated that 80 per cent. of children infected before the age of one year will die, while not more than 20 per cent. of those infected after 2 years of age will die.

It is a question whether asthma, which was long supposed to protect against tuberculosis, really does so. Certainly an asthmatic patient could have tuberculosis. It seems to be a fact that persons who suffer from heart-disease, especially if there is sufficient loss of compensation to cause more or less dyspnea and pulmonary passive congestion, do not have tuberculosis so readily. This subaeration may interfere with the growth of tubercle bacilli.

Tuberculosis of the cervical lymph-nodes may be due to an auto-infection. In other words, bacilli may be contained in the patient's own sputum, infect the tonsils and be there carried to the cervical glands.

A more or less continuously rapid pulse gives a bad prognosis. A temperature that is not greatly lowered by rest gives a bad prognosis. Of course, the case is serious as long as there is a morning fever. A patient whose temperature is normal or subnormal in the morning, even if there is considerable rise in the after-

noon and evening, may not only improve, but may recover. Any sexual excess, and even any sexual act during tuberculosis will aggravate the condition. A slight gain in weight, while desired and looked for, and generally an indication that the patient is improving, is not necessarily a positive indication that the prognosis is absolutely good, as many instances occur in which the patient gains weight for a time, under proper treatment, but the disease progresses. Therefore, a slight but steady gain in weight should be considered satisfactory, but should not cause too favorable an opinion of the outcome to be given.

It is considered a good prognosis when the lymphocytes in the blood are increased in number, showing that the nutrition is improving. It has also been considered that a normal number of eosinophils gives a good prognosis, while an absence of eosinophils gives a bad prognosis. Whatever the condition, however, it should constantly be borne in mind that pulmonary tuberculosis is curable in the first and second stages, and a cure may even take place in the third stage, or when there are cavities.

Reyher (*Monatschr. f. Kinderh.*, 1913, XII, p. 82) has found a coincidence between orthostatic albuminuria and tuberculosis. He investigated twenty patients suffering from this condition of orthostatic albuminuria, and found a hereditary taint, enlarged cervical glands, enlarged bronchial glands and reaction to the tuberculin test in all of them.

Pregnancy in a tuberculous patient makes the prognosis bad, and should call for a consultation to decide as to whether or not abortion should be produced.

ARRESTED TUBERCULOSIS

A patient who has even a temporary return to health must generally go to work, and the question of vital importance is, What shall the work be? There is no light outdoor work suitable for such recovered patients; hence, unless the occupation is one that is a menace to his health, a patient should return to his previous work. The education received during his cure should have taught him how to live to keep his

health. The next important rule for him to follow is to return to his physician for observation and advice at shorter or longer intervals, depending on his general condition.

PELLAGRA

The Thompson-McFadden Pellagra Commission in briefly summarizing its first progress report said: "The supposition that the ingestion of good or spoiled maize is the essential cause of pellagra is not supported by our study. Pellagra is in all probability a specific infectious disease communicable from person to person by means at present unknown. We have discovered no evidence incriminating flies of the genus *Simulium* in the causation of pellagra, except their universal distribution throughout the area studied. If it is distributed by a blood-sucking insect, *Stomoxys calcitrans* would appear to be the most probable carrier. We are inclined to regard intimate association in the household and the contamination of food with the excretions of pellagrins as possible modes of distribution of the disease. No specific cause of pellagra has been recognized." A second progress report (*Jour. A. M. A.*, Sept. 26, 1914) says: "Children under the age of 2, adolescents for about five years following puberty and adult males in the active period of life are at least frequently affected by pellagra. On the other hand, women from 20 to 44 years of age, old persons of both sexes and children from 2 to 10 years of age are most frequently affected. No definite connection between occupation and the occurrence of pellagra has been found, although the high pellagra morbidity in the women and children points to the home as the place in which the disease is usually contracted. Evidence of close association with a pre-existing case was disclosed in more than 80 per cent. of cases.

A house-to-house canvass of the homes of over 5,000 people living in six endemic foci of pellagra failed to disclose any definite relation of the disease to any element. In six villages studied few cases of pellagra originated almost exclusively in a house in which a preexisting pellagrin was living, or next door to such a house, suggesting that the disease

has spread most rapidly in districts where insanitary methods of sewage disposal have been in use. Additional evidence was obtained to support the conclusion that flies of the genus *Simulium* have nothing to do with pellagra. Animal inoculations and the experimental study of intestinal bacteria yielded no conclusive results. The studies of the blood showed a lymphocytosis in most cases, but have not disclosed any constant abnormality characteristic of pellagra. There was no evidence of inheritance of pellagra. The immediate results of hygienic and dietetic treatment in adults have been good, but after returning to former conditions of environment, most of the cases have recurred. In children, prognosis is very much more favorable."

In brief, these conclusions call attention to the present status of knowledge regarding the etiology and prevention of pellagra. They show the existence of two camps, one believing in the infectious nature of this disease, the other inclined to the belief that it is essentially a disturbance of metabolism.

Alessandrini and Scala have advanced the view that drinking water, because of the presence of silica in colloidal solution, may be of consequence in the causation of pellagra.

Goldberger (*U. S. Pub. Health Reports*, Sept. 12, 1914) summarizes the work of the United States Public Health Service on the study of pellagra and advances some most suggestive facts which point strongly to the belief that pellagra is essentially a disease of dietary origin, brought about in some such way as, for example, by the absence of essential vitamins from the diet, or, as has been suggested by Meyers and Voegtlin (*Pub. Health Rep.*, June 19, 1914) on the presence in vegetable foods of excessive amounts of a substance such as soluble aluminum salts.

An Illinois Pellagra Commission (*Arch. Inter. Med.*, August, 1912) reported results which incline rather to the infectious causation of the disease.

TREATMENT OF PELLAGRA

According to Voegtlin (*Jour. A. M. A.*, Sept. 26, 1914) all physicians who have had much experience

in the treatment of pellagra agree on one point; namely, that in the milder cases the symptoms will almost always disappear in a relatively short time if the patients are kept in a hospital, at rest, on a liberal mixed diet, with plenty of fresh meat. He has found drugs of little value, but calls attention to the use of arsenic which has been highly recommended by Lombroso. He warns especially against placing the slightest faith in proprietary pellagra "cures."

Niles (*Jour. A. M. A.*, Jan. 24, 1914, p. 285) gives an optimistic survey of the status of pellagra treatment. His observations cover over six hundred cases. In the hygiene of the disease two measures are of greatest importance, the forbidding of alcoholic beverages, which he has found are extremely detrimental, and the avoidance of direct sunlight except in spring and summer. There seems to be no doubt, as Voegtlin also remarks, that the skin of the pellagrin is hypersensitive to sunlight.

Diet.—Corn bread and corn-products are prohibited until the "zeistic" theory is disproved, as a precautionary measure. The diarrhea does not indicate a limitation in the dietary regimen. Tender steak, roast beef or mutton may be allowed once or twice daily, if the mouth is too sore to allow chewing, beef or white meats, either scraped or ground, may be substituted. Eggs are generally permissible, though it is well to use only the whites if flatulence exists. Sweet milk is valuable when it agrees with the patient. Fresh or artificially soured buttermilk is nearly always suitable. Niles believes that during the whole course of pellagra the individual should be nourished to the limit of assimilation. Goldberger advises that beans and peas may be eaten if fresh meat cannot be secured. In the winter the dried, not the canned, variety of the vegetables should be as large a part of the diet as they form in summer.

Medical Treatment.—Niles gives hypodermically 16 minims of iron arsenite solution and $\frac{3}{4}$ grain of sodium cacodylate in solution. These may be obtained in sterile ampules. The two drugs are given on alternate days, one being given every other day for about two weeks. After that the dose is given every two

days, still alternating the ampules. After acute symptoms have subsided the time between alternate injections is increased to three days and this is continued over several months.

By mouth he gives saturated solution of potassium iodid and Fowler's solution, in the proportion of five of the first to three of the second. Beginning with 5 drops in water, three times daily after meals, the dose should be increased one drop each day, until symptoms of arsenical saturation are manifested. This generally appears when 20 or 30 drops are being taken. When there is puffiness about the eyes on arising, stop the drops for two days, beginning again at the minimum dose of 5 drops, and increasing as before. This procedure is continued until the eruption and sore mouth are abated, and then continue in 8- or 10-drop doses for several months. Should there arise a gastric or intestinal intolerance, which is an occasional complication, it may be necessary to reduce the proportion of Fowler's solution to one or two in eight parts, instead of three.

For the frequent diarrhea satisfaction is obtained from bismuth betanaphthol and resorcin, with milk of bismuth as a vehicle. This failing, 15 grains of tannin after each loose action, or, as a last resort, powdered opium may be given.

For the infrequent constipation, either castor oil, liquid petrolatum, phenolphthalein or enemas will serve, drastic cathartics being inadmissible.

For the sore mouth, a solution of thymol, 1 grain to the ounce of water, a little alcohol being used as a solvent, will generally prove sufficient; or a solution of sodium borate and glycerin. For the stomatitis and glossitis, a daily application of a silver nitrate solution (20 grains to the ounce of water) is in most instances efficacious.

Stomach lavage is unnecessary, except in rare instances, when a great excess of sticky mucus constantly arises.

The simple erythematous rashes or even the sloughing conditions in the hands and feet may be benefited or cured by the bland ointments, such as zinc oxid, or a 5 per cent. boric acid. Raw or weeping surfaces

are soothed by a lotion of calamine and zinc oxid in lime-water, to which may be added a little rose-water or other pleasant adjuvant.

For the intense burning in the hands and feet, so often and bitterly complained of, either ice-cold compresses of a mild solution of mercuric chlorid, phenol (carbolic acid), 60 grains to the pint, applied at frequent intervals to the unbroken skin, or baths of hot mustard water are indicated. Two- or 3-grain doses of acetanilid, or 5-grain doses of acetylsalicylic acid, when the heart action is fairly good, will greatly relieve the neuralgic pains.

After the erythema has subsided, leaving a rough and harsh surface, alcohol rubs at frequent intervals will facilitate the disappearance of this horny layer.

Should mental symptoms predominate, deepening into melancholia, or lapsing into dementia, the patients should be placed in an institution for the mentally sick, as it is unwise, because of their varying or suicidal moods, to attempt their care at home.

Hydrotherapy has in many instances proved so beneficial in pellagra that some form of it, such as hot or cold baths, simple or medicated douching, packs, moist or dry rubs, accompanied by special massage, may be employed in nearly every case. Increased oxidation of the tissues, more rapid elimination, greater metabolic activity, sharpened appetite, improved digestion and assimilation, and a noticeable tonic effect on the whole living organism follow their use.

DISEASES OF THE RESPIRATORY TRACT

Colds far surpass in frequency any other disease condition. There is no immunity acquired by surviving a coryza, a pharyngitis or a bronchitis; in fact, ordinarily, the person is at least temporarily more susceptible to taking or developing a fresh cold. This may not be quite true of an influenza or grip cold, because many persons have a real or pseudogrip attack early in the fall or winter and are then more or less immune from acute attacks during the rest of that season; but there seems to be no doubt that the influenza bacillus leaves a patient temporarily, at least, more susceptible to other more dangerous germs, as the pneumococcus or tubercle bacillus. Consequently, besides the immediate debility that an acute cold causes, the possibility of opening the way for the entrance of more serious disease should cause every cold to be considered seriously and treated energetically.

While it is asserted by some that acute colds are always due to germs of some kind, it is conceivable that a too dry atmosphere, which is the condition in so many houses today, may so irritate or congest the nostrils as to allow the least irritant to cause at first a simple inflammation of the mucous membrane, which congested area may later pick up and harbor, or cease to kill, germs. It seems to be an established fact that good outdoor air does not predispose to colds as much as indoor air, and it is a fact that persons whose occupation is indoors are more liable to have colds than those whose occupation is outdoors. Whether or not every cold is due to contagium or to a germ, chilling, whether indoors or outdoors, certainly predisposes to colds. It is quite probable that chilling of the surface of the body congests the inner organs and possibly the mucous membranes of the air passages. If the mucous membrane of the nose is congested, it more readily becomes inflamed by irritation or by germs.

ACUTE CORYZA

This acute nasal catarrh, often called a "cold in the head," is of frequent occurrence in some regions, especially near the seacoast, and occurs repeatedly in certain persons who seem to have a susceptibility to inflammation in the nose. Some persons cannot be exposed to a single draft on any part of the body without an acute coryza starting. It is supposable, however, that while most acute nasal catarrhs are due to infectious germs, more or less chronically hypertrophied mucous membrane and more or less sluggish circulation in this membrane may allow simple non-infectious catarrhs to occur when irritation of any kind is applied. Other persons who do not have this susceptibility may become chilled, may be subjected to violent cold, damp winds, and may even get wet and still never develop a nasal catarrh. Just as large tonsils more readily catch germs and become diseased, or more readily harbor germs and have recurrent inflammations, so hypertrophied mucous membrane of the nostrils becomes susceptible to reinfection or to reirritation. Frequent acute colds, more or less constant subacute inflammations, or chronic catarrh may result from such a condition.

Some persons are susceptible to certain kinds of irritants, whether it be a particular kind of dust, a particular kind of pollen from plants, or the emanations or odors from stables, horses, etc. If this susceptibility is in excess, or occurs at certain times of the year, the patient becomes a so-called hay-fever or rose-fever sufferer, and then shows symptoms of anaphylaxis.

TREATMENT

The preventive measures have already been referred to and described. They consist of proper bathing to keep the skin in good condition; proper clothing, depending on the region, season and exposure; proper heating and ventilation of living rooms, bedrooms and buildings in which persons are employed, and in the case of the child, proper heating and ventilation of the schoolrooms. Too severe exposure of young children and babies to dampness and winds is inexcusable and does not increase their resistance against catching

cold, and often precipitates more serious conditions. Any person who has a tendency to nasal or pharyngeal colds should not suffer undue exposure at night. Too many windows being open may cause too much direct draft over the face. Fresh air sleeping should be governed by common sense. Cold daily sponging of the child's face, neck and chest, followed by quick friction, is a splendid means of decreasing the likelihood of catching cold or becoming chilled. Older persons may take cold showers or cold plunges in the morning, if it is advisable in individual cases.

Children especially should not be subjected to unnecessary infection by being taken into crowded cars, stores or into various assemblages, where it is impracticable to avoid close contact with coughing or sneezing persons who do not properly protect the surrounding atmosphere by using handkerchiefs.

As so many times urged, a child or adult who has repeated colds should be examined and properly treated medically or surgically by a nose and throat specialist. The family should also be taught that the exchange of handkerchiefs and the use of the same towels when one member of the family has a cold or sore throat is inexcusable. Direct contagion by this method is probably very frequent. During all colds the nasal and throat secretions or excretions should be received into paper handkerchiefs, or pieces of cheese-cloth, and either immediately burned or deposited in a paper bag for burning later. If handkerchiefs are used, they should be washed separately and soon.

A too dry indoor atmosphere can harm the mucous membranes of the upper air passages as it leaves the membranes unprotected, and the first irritant that attacks them may cause an inflammation.

Acute coryza having begun, an attempt should be made to abort it. There are various methods of relieving internal congestions, and the general principles are the same in all cases, wherever the localized inflammation may be. These general methods are some means to reduce an increased temperature, some means of bringing the blood to the surface of the body and increase perspiration, some means to produce free catharsis and thus to deplete the blood-vessels and lower the blood-pressure to relieve indirectly the ten-

sion in the region of congestion, and some means to prevent the development of the second stage, or stage of secretion, if possible. Methods used to meet one of these indications will many times meet one or more of the others; hence the treatment is often very simple.

If the patient is first seen in the morning, or before the middle of the afternoon, the best treatment is a saline purge of some description, as exemplified by the Seidlitz powder or by the effervescing magnesium citrate or Rochelle salt, or castor oil if that is preferred. If the patient is seen first in the evening, a less quickly acting cathartic is advisable, and none is better than a small dose of calomel, as from 0.05 to 0.20 gm. (about 1 to 3 grains), depending on the age of the individual, combined with 0.50 to 1 gm. ($7\frac{1}{2}$ to 15 grains) of sodium bicarbonate. Or, 1 grain of calomel may be given with an ordinary compound aloin pill or tablet. The old-fashioned Dover's powder is still given by many physicians and often works well, but may cause considerable nausea. Also, opium or morphin in any form tends to inhibit free action of the bowels, which is undesirable. One of the best treatments is one of the coal-tar products, such as antipyrin, acetanilid or acetphenetidinum. Any one of these may be given in one fair-sized dose or in two medium-sized doses, or in several small doses. One gm. of antipyrin would be a full dose; 0.50 gm, repeated in five or six hours, would be a medium dose; 0.30 gm. of acetanilid would be a large dose, and 0.10 gm. might be repeated at three-hour intervals for three times. A satisfactory method is a combination of acetanilid with sodium bicarbonate, and a prescription similar to the following is often very valuable:

| | | | |
|--------------------------|------|----|--------|
| | Gm. | | |
| R Acetanilidi | 0\|25 | or | gr. v |
| Sodii bicarbonatis | 2\|50 | | gr. xl |
| M. et fac chartulas 5. | | | |

Sig.: One powder every two or three hours.

A similar combination may be given in tablets, if preferred. It should be remembered that caffen has been shown not to protect the heart from depression caused by large doses of a coal-tar product; therefore, there is no object in adding caffen to such a prescription. When these coal-tar prcduts are ordered, it is

well to give coincidently hot lemonade. Perspiration is more readily caused by this means.

Provided the patient is not soon to be subjected to exposure, a hot bath is another efficient means of relieving internal congestions, and can be used coincidently with the other treatment. Acidum acetylsalicylicum (aspirin) is now more largely used than almost any other drug to abort colds. The laity, on account of the instruction which they have received of the dangers of acetanilid and similar drugs, now all buy and use this drug with the greatest freedom. It can cause cardiac depression, and should not be used *ad libitum*. If preferred, it may certainly be ordered.

Rhinitis tablets are sold everywhere to the laity, and are largely used by physicians. These are various combinations of morphin, atropin, strychnin and aconitin. The minute dose of aconitin ordered probably generally has no action. If one desires the activity of aconite, it is best to give it in a tangible form and dosage, namely, the tincture of aconite, a drop perhaps every half hour or hour, until the pulse shows the activity of the drug. However, this treatment ordinarily requires that the patient be seen within a certain number of hours by the physician, to ascertain whether or not the aconite should be stopped, unless the doses are limited in number. The old aconite treatment of colds has mostly given place to the newer treatments described above. The whole rhinitis tablet combination probably represents principally the action of atropin with some help from the morphin, both of which will dry up the secretions of the nostrils and throat. The small amount of strychnin probably is not very active. Sometimes minute doses of quinin enter into these combinations, but that probably is not active. In other words, it is a question if a small dose of atropin sulphate, given frequently, does not act as well as one of these rhinitis combinations.

There is no question about the drying up of secretions by morphin, if this drug is pushed. Rarely is such treatment needed. The old-fashioned treatment of a hot foot-bath, a hot whisky punch, and the patient put to bed is a treatment that is often successful. The upper air passages and the head are relieved from congestion by such treatment, the blood-vessels of the

surface are dilated by the alcohol, and the patient perspires more or less and the treatment is conducive to comfort. In this age, however, when other vasodilators are accessible, it is rarely necessary to resort to alcohol.

Quinin sulphate has been used for years as an abortive treatment of colds, and the laity, until more recently adopting acetylsalicylic acid, have always resorted to this drug. Small doses would probably not have any very decided action; large doses are inadvisable at this stage of the congestion because of the tendency to congest the middle ear.

Spraying or snuffing solutions into the nostrils at this stage is inadvisable. The throat may be gargled with warm physiologic saline solution, which is roughly represented by $\frac{1}{4}$ teaspoonful of salt to half a glass of warm water. If the patient has been known to be exposed to some acute throat or nasal infection, more active antiseptic gargles and sprays may be used; but an acute coryza will rarely be aborted by local treatment.

If the inflammation is not aborted and the second stage develops, that of profuse mucus and some mucopurulent discharge, then cleansing of the nose and throat becomes urgently needed. At this stage all of the foregoing abortive measures should cease. A patient who has been more or less deprived of food, except a small amount of liquid nourishment for from twenty-four to thirty-six hours, may now resume his normal diet.

The more or less purulent discharge from the nostrils should not be allowed to remain blocking up the passages. Consequently, atomizing with warm saline and alkaline solutions should be more or less frequently done. Various compound solutions or tablets for solution are offered, but there probably is no advantage in these combinations over more simple ones. The simplest cleansing solution is one made from $\frac{1}{2}$ teaspoonful of salt and $\frac{1}{2}$ teaspoonful of sodium bicarbonate to a glass of warm water, or half these amounts for half a glass of water. To be properly soothing, the solution should always be warmed. The same solution may be used as a gargle. If a mild antiseptic is

needed, saturated solutions of boric acid or borax are efficient. If stronger antiseptic solutions are required or advisable, hydrogen peroxid is valuable, as 1 part of the official aqua hydrogenii dioxidi to 4 or 5 parts of warm water for a gargle, or 1 part to 7 or 8 parts of warm water for a nasal spray. Nasal spraying and proper cleansing of the nose protects the adjacent sinuses from infection.

Cleansing the nasopharynx by snuffing back a solution from a teaspoon or a small vial, or snuffing back a spray, or gargling and then throwing the head forward and washing the nasopharynx, protects the eustachian tubes from infection. Two cautions should be suggested: first, that douching of the nasal passages should not be done with the nostril blocked, or with a high placed douch reservoir, as the pressure is likely to be sufficient to send fluid into the eustachian tubes or into the sinuses, and cause inflammation of such parts. Most of the patented douch apparatus are inadvisable. The second precaution is that it is not well to cleanse the mucous membrane of the nostrils too thoroughly of mucus before the patient goes into the outside air, especially if that air is dust-laden. The proper time to spray is when the patient is to remain in the house for a short time; or if he is sprayed and then must go out of doors, he may receive a non-irritant oil spray to furnish a coating for the mucous membrane, this to be used after the alkaline spray. Or a small plug of cotton may be placed in the nostrils.

If the secretion from the nose is tenacious and hard to dislodge by blowing the nostrils, ammonium chlorid may be a drug of value. It has been used as a stimulant to the upper air passage mucous membrane as well as to the bronchial mucous membrane. It may be given in a simple preparation as:

| | Gm. or c.c. | |
|---------------------------|-------------|-----------|
| R Ammonii chloridi | 5 | 3 iss |
| Syrupi acidi citrici..... | 25 | or fl.ʒ i |
| Aquae.....q. s. ad | 100 | fl.ʒ iv |

M. et Sig: A teaspoonful, in water, every three hours.

If the coryza tends to become subacute and prolonged, tonic treatment is required; a small dose of quinin and a small dose of iron, with or without

arsenic and strychnin, are advisable. Or calcium glycerophosphate may be given in doses of 0.30 gm. (5 grains) in capsule, three times a day, after meals. The following tonic capsule may be used, and the doses may be modified for a child:

| | Gm. | |
|-------------------------------|------|------------|
| R Arseni trioxidi..... | 0\|04 | |
| Strychninae sulphatis..... | 0\|04 | aa gr. ⅓ |
| Ferri reducti..... | 1\|0 | or gr. xv. |
| Quininae sulphatis..... | 2\|0 | gr. xxx |
| M. et fac capsulas siccas 20. | | |

Sig.: A capsule three times a day, after meals.

If the mucous membrane of the nose and throat does not return to health, and the secretion of mucous does not seem to be sufficient, a great promoter of secretion is an iodid, and the best salt is the sodium iodid. The dose required is not large; 0.10 to 0.20 gm. (1½ to 3 grains) three times a day, is generally sufficient.

Various menthol, camphor and pine oil preparations are used as sprays or applications for the nostrils, sometimes with good results, or as inhalants when the nostrils tend to become closed and cause discomfort by occlusion. Such treatment has its use at times. Spraying with suprarenal solutions is sometimes of advantage, but sometimes is followed by more congestion. Some nose and throat specialists use suprarenal preparations constantly. Such treatment certainly many times is efficient in temporarily relieving congestion and giving comfort.

This discussion of the treatment of common colds would not be complete without reference to the vaccine treatment. While the exact value of such treatment has not been determined as an abortive treatment or as a treatment that shortens the course of the disease, the enthusiastic recommendation of such treatment by some writers should be recognized. When there is sinus infection, autogenous vaccines would seem indicated.

ACUTE PHARYNGITIS

The abortive treatment of this inflammation is the same as that described for acute colds.

With a simple pharyngitis, soothing alkaline gargles, as previously described, should be the treatment. A

very simple, pleasant and efficient gargle is as follows:

| | Gm. or c.c. | |
|-----------------------------|-------------|-----------|
| R. Acidi borici..... | 2 | 3 ss |
| Potassii chloratis..... | 5 | or 3 iss |
| Aquae menthae piperitae.... | 200 | fl. 5 vii |

M. et Sig.: Use undiluted as a gargle, every three hours.

COUGHS

Before discussing the infections of grip and whooping-cough, it may not be out of place to refer to the varying kinds of cough. Only by careful observation can the early stages of whooping-cough be suspected and discovered.

Coughing is an expiratory effort caused reflexly by some irritation. The muscles of the lower part of the chest are most engaged in the act of coughing; hence in severe, prolonged or frequent coughing muscle tire occurs in the lower part of the chest, both anteriorly and posteriorly. The abdominal muscles all take part in this expiratory effort, and the erector spinae muscles, the serratus, and the quadratus lumborum are all utilized in a strong expiratory cough. These muscle contractions compress in all directions the lower part of the chest, and the air in the bronchial tubes is forced upward, and if there is no obstruction is expelled through the glottis. If there is obstruction, or even partial obstruction, the upper portion of the lungs, especially the apices, become dilated, and temporarily, or in severe cases, permanently, emphysematous.

Cough can be caused by irritation of any of the mucous membranes of the air tract, by irritations of the nerves in the lung tissue, by irritations of the pharynx, by reflex irritation of the vomiting center, and by any irritation that can reach, through the pneumogastric nerve, the center in the medulla. From any of these reflex causes efferent impulses are transmitted, and the result is a cough. Irritation in the nose and ear may cause cough.

Pain and muscle tire from prolonged coughing, besides occurring in the lower part of the chest, occur in the sides, low down, perhaps in the region of the insertion of the diaphragm, and also in the back even

down in the lumbar region. These strong contractions of the abdominal muscles during coughing also aid in temporarily diminishing the capacity of the thorax by pushing upward the abdominal organs. At the same time there is a considerable force exerted downward, which may tend to cause uterine displacements, hemorrhoids and even involuntary urination.

Before this forcible expiration or cough there is generally a deep, quick inspiration; then the glottis is partially closed and the air is propelled upward forcibly, causing friction which tends to expel anything on the walls of the mucous membrane of the bronchial tubes and trachea. Even in simple bronchitis, if there is much coughing, there will be found increased resonance in the apices of the lungs, as there is probably always a temporary emphysema.

Nasal irritations may produce cough as frequently as they cause asthma. Irritations of the nasopharynx and pharynx proper frequently cause coughing, which is very likely to be accompanied by retching and even vomiting. An elongated uvula may tickle the epiglottis and cause spasmodic, quick expiratory coughing. This cause, however, is rare compared with the frequency of cough caused by an enlarged lingual tonsil, whether the tonsil is hypertrophied, contains dilated blood-vessels, or is inflamed. Any disturbance of this gland or lymphoid tissue may cause a tickling in this region sufficient to produce a very irritating and disturbing dry cough, which comes on sometimes in paroxysms, until a certain amount of mucus is literally scraped off. The very intensity of the cough so irritates the part, like scratching a spot on the skin that itches, as to stop the tickling sensation for a time. Irritations of the larynx almost always cause cough. Hence no examination of a patient who coughs is complete without a throat and larynx observation.

The dry bark of spasmodic croup is very characteristic. The noise is low pitched, and is a bark. If it is husky there is mucus or membrane present.

The cough of bronchitis can be of all descriptions; it may be dry, may be non-productive, and may be moist and productive. Pain in such cough (the same is true of grip) is referred under the sternum, and is due largely to the vibrations of the air causing pain to

the inflamed mucous membrane of the trachea and perhaps larger bronchi.

The cough of pneumonia is at first somewhat painful, and the pain is referred to the side, near the nipple. This cough may be at first dry, but is soon productive and generally should be encouraged.

The cough of pleurisy is non-productive and undesired, and is never loud. It causes pain referred to the side, and is repressed by the patient. There is nothing to expectorate, and it should be discouraged and stopped.

The cough in the first stage of tuberculosis is often dry and catchy; it is a hack. There is no great intensity to this cough, and no necessity for it, and it should be discouraged. As soon as there is much local bronchial catarrh the cough should, as it is then productive, not be discouraged, except at meals, and in the presence of others; that is, such patients should be taught when to cough.

The cough of asthma is a wheezing affair and accompanied by all sorts of rattlings; the same type occurs in a stuffy, asthmatic bronchitis. This cough is generally not harsh.

The coughs of different individuals vary. Some always cough with great intensity, and others easily and lightly. Older persons seem to raise mucus and pus from the bronchial tubes with difficulty. It takes a great many coughs to raise the sputum for expectoration. Young children generally cough easily, but generally swallow their sputum. Very weak patients will hardly expectorate at all. In such cases the foot of the bed may be raised at night; also when they cough while in bed, they should turn onto the side or stomach in order to raise the sputum, or they should lean over in order to have gravity aid as much as possible the expulsion of the mucus, etc. The cough of pertussis occurs in showers or paroxysms, and at the height of the disease the glottis closes during inspiration and the air is sucked in through a more or less narrow slit, giving the characteristic "whoop."

Persons coughing very hard, as typically in whooping-cough, but also in emphysema and in the severe bronchitis of strong, sturdy men, will cause a great deal of cardiac disturbance by retarding the flow in

the large vessels of the thorax, thus increasing the work of the heart, especially of the right side. Such coughing can force backward the blood in the large veins thus congesting all the organs, notably the eyes, face and head, and whooping-cough can cause a cerebral hemorrhage or a hemorrhage into the eyes. These patients may not infrequently have nosebleed, and even vomit blood.

ACUTE BRONCHITIS

There is no question that, whether bronchitis occurs in an adult or in a child, the patient will recover more quickly if he remains in bed for one or more days.

The prophylactic treatment is the same as for an acute coryza, and these treatments will more or less relieve the congestion in the bronchial tubes and promote expectoration, if the disease is not aborted. The cough is at first non-productive, but as soon as mucus begins to be plentifully expectorated the cough is productive, the tightness in the chest is relieved, and the patient feel better. One of the best promoters of a free mucus secretion is ipecac, and a few drops of the syrup of ipecac, given every hour, unless nausea is caused; or from 0.03 to 0.05 gm. (about $\frac{1}{2}$ to 1 grain) of the powdered ipecac may be given every two hours. The ipecac should never be pushed to the point of causing uncomfortable nausea. The dose should, therefore, as suggested, be very small.

In the second stage of bronchitis there is no expectorant that seems to work so well as ammonium chlorid, and the dose should be about 0.25 gm. (4 grains) every two hours. The bad taste of this drug may be well covered up by giving it in a sour mixture, as the syrup or citric acid and water. If the cough is excessive and more than the secretion calls for, there is possibly no better method for its control than to give small doses of codein sulphate. This may be combined with the ammonium chlorid in a sour mixture, as:

| | Gm. or c.c. | |
|----------------------------------|-------------|---------|
| R Codeinae sulphatis..... | 0\|20 | gr. iv |
| Ammonii chloridi..... | 5 | ʒ iss |
| Syrupi acidi citrici..... | 25 | fl.ʒ i |
| Aquae.....q. s. ad | 100 | fl.ʒ iv |

M. et Sig.: A teaspoonful, in water, every two or three hours.

This prescription is for an adult, but may be readily modified according to the age of the child. If the codein is not desired, it may be omitted. If it is desired to give the ammonium chlorid less frequently, the dose may be made larger. If a sweeter mixture is preferred, the syrup of tolu may be substituted for the syrup of citric acid; or both the syrup of citric acid and the water may be omitted and the syrup of wild cherry substituted.

If the larynx is inflamed, the inhalation of simple steam, or various other inhalants, may be of value, but a patient with laryngitis of any type should be under very careful observation by a physician.

If the expectoration becomes more profuse and seems not to stop readily, terpin hydrate seems to be of value. The dose is 0.30 gm. (5 grains) about four times a day. This may be given in tablet or in powder; solutions are unsatisfactory as it is very insoluble. If deemed advisable it may be combined with codein or heroin in small doses. There is, however, no real advantage in heroin over codein.

If the coughing persists longer than a week, the sputum should be examined to determine what germs are present. If it proves to be a simple bronchitis, but prolonged, sodium iodid in small doses may be of value, especially if the patient is at all asthmatic, or if it is in an older person. Fresh air, good food and iron are always of value in curing all kinds of bronchitis. If the patient is a child and the nutrition is poor, cod-liver oil is good treatment. A bronchitis that will not stop must be treated as a pre-tuberculous stage of tuberculosis, and the patient should receive climatic, or open air rest cure treatment.

It should be emphasized that a patient with bronchitis is not properly supervised unless the temperature is taken, and this more or less frequently. A patient with a fever should remain at home, if he wishes to avoid complications that readily occur from an acute bronchitis or grip. The district nurse or the medical inspector should always take the temperature of a coughing child. If a child has any fever, it should be sent home and the family physician summoned.

INFLUENZA: GRIP

While the well-known acute epidemic types of this disease probably always show the influenza bacillus, it is not always discovered in instances that seem similar and are well termed grip or influenza, as distinct from an ordinary cold or bronchitis. The small blood-vessels all over the body seem to dilate and produce capillary congestion, especially of the mucous membranes, the most frequent result being a coryza, a pharyngitis, a laryngitis or a tracheitis. The congestion in the larynx causes the harsh, dry, metallic cough which is quite characteristic of this type of influenza. The congestion and swelling of the mucous membrane of the trachea causes a peculiar oppressed feeling with more or less pain, referred to the upper part of the sternum. The great amount of sneezing which occurs with a typical attack, almost similar to hay-fever, is due to congestion of the mucous membrane of the nostrils. The conjunctivae may also be injected, causing pain in the eyeballs and often a serous conjunctivitis, another typical symptom of influenza. In some seasons there seems to be a special tendency to middle-ear inflammations. At other times there frequently occurs a congested drum, with sometimes a hemorrhagic bleb or vesicle on the drum, a very painful though easily remedied condition.

The almost constantly present lumbar backache at the onset of this disease is probably due to congestion of the kidneys, and albumin is frequently found in the urine of such patients, and occasionally blood-corpuscles. A menorrhagia or a metrorrhagia may occur from the same tendency to dilatation of the blood-vessels. There may even be nosebleed, and occasionally a slight hemoptysis without any other assignable cause and without any subsequent development. With this disease, although the fever may be high, the skin is likely to be moist, and there may be a profuse perspiration. The pulse may be slower than we normally expect from the height of the fever, and the blood-pressure is generally lowered; all of these conditions are due to the tendency of the blood-vessels to dilate.

The heart is generally weak from start to finish in this disease, and even collapse turns can occur.

Rather an infrequent type of the disease is the bowel type; this can occur without respiratory catarrhal symptoms. Patients so affected have diarrhea, with more or less intestinal irritation, apparently the greatest amount of dilatation of blood-vessels in these cases occurring in mucous membrane of the intestinal tract. These various types, the catarrhal, the nervous and the abdominal, may be interwoven, and a patient may show symptoms of all three.

The future of every case of influenza is prostration, nervous and muscular debility, with more or less circulatory weakness; in other words, there is exhaustion. The patient's resisting power is reduced, and any defect or diseased condition that he may have is aggravated by an intoxication with this germ.

If no complications occur, the convalescent patient should rest as much as possible, should not be subjected to exposure and should be given tonics, and, if necessary to cause restful sleep, for a short period at least, some hypnotic or some physical method of causing sleep. The most frequent complication is pneumonia, and the type of pneumonia that the influenza germ seems to cause most frequently is the lobular or bronchial pneumonic type; pneumonic congested areas may be found in different parts of one or both lungs. Not infrequently, however, true lobar pneumonia occurs.

The next most frequent complication, as suggested above, is middle-ear catarrh: The various sinuses in the region of the nostrils may become affected; all types of indigestion may occur, and not only sleeplessness and meningismus, but also a very serious meningitis, and even insanity can be caused by these germs and their toxins. Mental depression is a common occurrence, following severe attacks of grip. Pericarditis and endocarditis occur as complications of influenza.

It is thus seen that this disease should always be taken seriously, and every possible means used to prevent contagion, as it is one of the most highly contagious diseases. It spreads with great rapidity, but only by contact, although it may doubtless be transmitted by infected clothing, and perhaps even by letters, as when the last epidemic first reached America.

the first persons affected in many cities were post-office clerks.

While no season is exempt from this disease, it occurs most frequently in colder weather, and in the colder climates, and in moist climates. Perhaps the more sunshine, the less frequent the disease. While one attack may protect a person for that season, he seems more susceptible to subsequent attacks in following years. There are doubtless many carriers of this disease who may have a persistent and continued subacute or chronic catarrhal infection and very likely are distributors of the disease to others. When one case occurs in a household, other members of the family become readily infected. The same is true in schools and in stores or buildings in which an infected person is closely associated with others. Many an office with one employee affected will soon, on investigation show every other employee to be more or less seriously affected. While almost all persons are susceptible to this disease, a few seem to be immune. It is the most frequent of all definite infectious diseases.

TREATMENT

It having been determined or suspected that a patient has influenza, it is much more important that he remain in bed, or at least in the house, than if he has an ordinary acute cold. Also, it is more essential that he be more or less isolated or that measures be taken that he does not spread the disease by spraying from coughing or sneezing, and that he does not use the same towels, napkins, drinking-cups and eating utensils as other members of his family. The patient should be prohibited from fondling and kissing children. If the patient is a young child in close contact with the mother or nurse, all possible precautions to prevent contagion should be taken.

In a word, each family should be taught that grip is an infection, that it is contagious, that it spreads rapidly, that it may have serious complications and that it frequently leads to pneumonia, which has become in many regions of this country the most frequent cause of death. Therefore, even an apparently mild case of grip or influenza should be treated actively

and energetically. As previously stated, whether a schoolchild begins with an acute cold or an influenza, he should be sent home and remain there until he is well, or at least almost well.

As a grip patient is liable to have a chill, or at least feel chilly or have cold sensations up and down the back, anything that makes him warm improves his condition. He may be given hot malted milk, hot tea or hot lemonade, at more or less frequent intervals, until his chilliness has ceased. The patient may be given a hot tub bath and then put into a warm bed in a warm room as an efficient means of making him comfortable and relieving his internal congestions. Hot water bags at the feet and extra coverings to the bed are often needed. A quickly acting stimulant is aromatic spirits of ammonia, given in half teaspoonful doses in hot water or hot lemonade, at intervals of three hours, for three or four times. The various methods suggested for aborting an acute cold may be used in this disease. Much greater care must be exercised, however, if the patient has the influenza infection than if he has a simple cold, as to when he can return to his work or occupation, or be subjected to exposure to cold or dust, either in a house, building or outdoors.

As soon as the patient feels warm, the temperature may rise quite high, associated with severe headache, backache and irregular pains in other parts of the body. At this time a drug such as acetanilid, antipyrin, acetphenetidinum, or acetylsalicylic acid will be of benefit, provided that the patient is not ambulatory, and that he is not to be subjected to exposure. With this depressing infection such treatment is not wise unless a patient is in bed, or at least remains in the house.

The proper dosage of these drugs has already been suggested, and no one of them should be long continued. The most depressant is undoubtedly acetanilid, and perhaps the least depressant is acetphenetidinum. Should depression occur after one of these drugs has been administered or from the disease, circulatory stimulants such as aromatic ammonia, camphor or caffeine should be given and the patient surrounded with dry heat. A hypodermatic injection of

strychnin sulphate, 1/30 grain, may be given to stimulate the nerve centers. Cyanosis has not infrequently been caused by acetanilid, but an amount of this drug large enough to cause such a condition should never be given. The following prescription may be suggested:

| | | |
|-------------------------|------|-----------|
| | Gm. | |
| R Acetanilidi | 0\|50 | gr. viiss |
| Sodii bicarbonatis..... | 1\|0 | gr. xv |
| M. et fac chartulas 10. | | |

Sig.: One powder, with water, every two hours, except when the patient is sleeping.

| | | |
|---------------------------|------|------------|
| | Gm. | |
| R Acetphenetidini | 1\|50 | |
| Phenylis salicylatis..... | 1\|50 | ãã gr. xxv |
| M. et fac chartulas 5. | | |

Sig.: One powder every three hours.

It should be remembered, as previously noted, that it has been shown that an alkali like sodium bicarbonate inhibits the undesired action of coal-tar drugs on the heart; also, that caffenin does not protect a heart from undesirable activities of the coal-tar drugs; in fact, it has been shown to intensify such activity.

In making a diagnosis of the infection present it is well to remember that any of these drugs, and also salicylic acid in any form, may cause eruptions on the skin, either erythematous or urticarial.

But little food is needed during the first twenty-four hours of grip, and it should not be pushed even on the second day, if food is repugnant to the patient. He should have plenty of water and such simple liquid nourishment as he desires. As soon as the appetite returns, food should be pushed. The various catarrhal conditions should be treated as suggested under coryza, pharyngitis and bronchitis. Also, while the patient is kept warm, he should have good fresh air in his room. This is essential with all infections, and especially with infections of the nose, throat and lungs. The bowels should be treated as indications call for. Simple laxatives may be given, if needed, or the soothing bismuth subcarbonate, if there is intestinal inflammation. Phenyl salicylate (salol) may be given, if there is much fermentation in the bowels, or the Bulgarian form of lactic acid bacilli may be given for a few days.

As soon as the patient begins to convalesce, he should be given tonics, and if there is no inflammation in the ears, quinin is valuable. Some form of iron should generally be given, and possibly a bitter tonic before meals. If the patient is not nervous, a small dose of strychnin three times a day is good treatment. On the other hand, it should be urged that strychnin stimulation is overdone, and a patient who cannot sleep should not be given strychnin or quinin later than the noon meal. Sometimes the sleeplessness following influenza is benefited by the administration of one-half to one teaspoonful of good fluidextract of ergot, taken an hour before bedtime. These patients should never be allowed tea or coffee after the noon meal, as they are very susceptible to cerebral stimulation by caffeine and are likely to remain awake for hours from such stimulation. All disturbances or diseased conditions left over by grip must be treated energetically, else they tend to be prolonged. There are few germs that seem to be so tenacious and persistent, at least in their unpleasant results, as is the influenza bacillus. All persons are susceptible to serious consequences from influenza.

ASTHMA

In the first place, the disease asthma should be dissociated from conditions which are termed asthmatic. A patient may be asthmatic from various causes, but the term asthma should be limited to the disease or condition itself, i. e., periodic attacks of bronchial spasm. More or less continued dyspnea, with or without whistling râles, and with or without acute attacks of asthma, may be caused by cardiac disease, cardiac asthma; by renal insufficiency, renal asthma; by plethora, causing attacks of acute hyperemia of the lungs; by arteriosclerosis; emphysema; diabetes; thyroid disturbances, and by the various anemias. Spasmodic asthma may be caused by bad heart attacks; by acute toxemia from renal insufficiency; by exacerbations of gout, probably due to a toxemia from nitrogenous metabolism; by acute indigestion, and by gastrointestinal irritants causing a swelling of the mucous membranes of the bronchial tubes, really an urticaria. This swelling of the mucous membrane of the bronchial tubes has been caused by injections of horse serum.

CAUSES

The diseased condition, or neurosis, termed true asthma, is often due to irritation of the nose and throat, and sometimes of the ear; is frequently due to chronic bronchitis, often is concomitant with acute disturbances of the mucous membranes of the upper air passages, as when caused by irritations from pollen, such as hay fever, rose fever, and by various dust and drug irritants. Asthma, however, is frequently a simple neurosis.

An attack of asthma generally occurs at night, and may be preceded by headache, some symptom of indigestion, mental depression or nervous irritability. There is at first some slight dyspnea and a short-dry cough. The dyspnea and consequent cardiac distress increase, and the agony suffered by these patients can not be understood unless one has seen them suffering from an attack of this terrible disease. The agony is almost as great as that of acute cardiac dyspnea, although there is not so much mental anxiety. The patient may be pale or almost livid, and the expression of the face shows the suffering due to attempts to inspire, and then to expire, through the contracted bronchial tubes. The muscles of inspiration being stronger than the muscles of expiration, for a time more air enters the lungs than can get out, and little by little there is increased chest distention. Percussion shows hyper-resonance. The greatest amount of wheezing, as shown by the stethoscope, is in expiration, and the expiration is prolonged in the attempt to empty the lungs and prepare them for the next inspiration. If the bronchial secretion begins, as it generally does, moist râles may also be heard, and, after a series of spasmodic efforts, the cough brings up white glairy mucus.

The length of these attacks of acute asthma, if unrelieved, varies from an hour or two to all night, and sometimes an attack may last several days. Occasionally the attacks last for many hours, or even days, in spite of all treatment, and any temporary relief given by powerful drugs may not prevent the resumption of the asthmatic spasm the moment the patient is out of the influence of the drug. The amount of dyspnea

that the patient has, and the amount of suffering and the seriousness of the attack, do not bear a close relation to the amount of wheezing that is heard. A patient may not suffer greatly from dyspnea so long as he is sitting upright, and yet be wheezing like a decrepit old horse.

The longer the paroxysm lasts and the more intense it is the greater the danger of permanent injury to the heart and the greater the danger of the distention of the chest, so injuring the lung tissue as to make the emphysema permanent. Even after repeated attacks most patients have no cardiac injury and no lung injury, but this is doubtless because most of those who suffer from acute asthma are young; the older patients do have more or less lasting bronchitis, heart debility and more or less constant dyspnea and often emphysema. It is rare for a patient to die during an attack of acute asthma, but the condition should always be considered serious, as it could never be decided how much future disability was caused by the prolongation or repetition of such serious disturbance of the vital functions of respiration and circulation.

Acute attacks of asthma may occur every night for a series of nights, and then not for a long period, or after one attack there may be no more for some time, or they may occur more or less periodically, or they may recur only at certain periods of the year or in certain places. These last are likely to be due to nasal irritations. The attacks may also occur more or less frequently for several years, or even for a lifetime.

GENERAL TREATMENT

The opinion is gaining ground that asthma is a form of anaphylaxis. The physician should endeavor to ascertain what type of hypersensitiveness each case presents.

The treatment of this troublesome disease, or condition, will never be a success unless the cause has been determined, and, if possible, removed. Hardly any patient with any disease should receive a more careful general examination than the asthma patient. The lungs must be carefully examined for bronchitis and emphysema, and more serious conditions found or

eliminated, and the blood pressure taken. The digestive ability of the stomach and intestines should be investigated, the urine should be examined, and all possible reflex causes sought in the throat, nose or ears. If all tangible causes of the asthmatic attacks have been eliminated, a careful analysis of the excretion of the various salts and solids in the twenty-four hours' urine, on a known diet, should be made. Even careful examinations of the feces, on a known diet may give conclusive evidence of the cause of the toxemias that give rise to asthma. So much for negative evidence.

DRUGS IN ASTHMA

Perhaps the most frequently successful drug in preventing the recurrence of asthma is an iodid, and this is probably because most asthma is due to affections of the air passages, and this drug is specifically a stimulant to the mucous membrane of the nose, throat and bronchial tubes. If any chronic disturbance is located in these mucous membranes the iodid tends, first, to increase the exudate from these membranes, then to make the mucus more liquid, and, while at first apparently irritant, soon relieves congestion of these membranes, and often, sooner or later, cures a chronic congestion and causes the membrane to become healthy. Hence the frequency of success from iodid simply emphasizes the necessity of a careful examination for, and the removal, if found, of any nasal obstructions or irritations. After such removal, a sensible treatment to prevent the recurrence of attacks would be the prolonged administration of iodids, and very large doses are seldom needed, or if the history of the attack shows long standing of the disease, the treatment of the neurosis by bromids is advisable, and here again the dose should not be large. We should not produce debility either with iodid or with bromids.

Arsenic, a so-called alterative drug, seems at times to have a specification on the respiration. In chronic bronchitis, in asthma, in catarrhal conditions of the air passages, arsenic, when given for a long period, is sometimes of considerable benefit. The respiratory ability and freedom from colds and coughs of the arsenic eaters of France and the Alps is well known.

A local cause in the upper air passages having been removed, if there was any such, besides treatment either by iodids or bromids, if either one is deemed advisable, anything that will improve the general health of the individual should be utilized. An occupation in which there is an atmosphere of dust or other irritant should be changed for one more suitable. Perhaps indoor work should be changed for outdoor work, perhaps the climate or location should be changed. Any indigestion, gastric or intestinal, should be corrected; constipation should be prevented; anemia should be treated, and insufficiency of the thyroid, if present, should be noted and modified.

If asthma recurs at certain periods of the year as does hay fever, the preventive treatment is the same as for hay fever. Anything that will reduce the nasal irritations and congestions will relieve the asthma, and any change in location that will prevent the hay fever will generally prevent the asthma. To just what locality or climate an asthmatic patient should be sent is difficult to determine. Also, it is impossible to predict that, because one patient is benefited by a sojourn or residence at one particular place, that place will be beneficial to the next patient. Theoretically, regions free from dust and vegetation should be the regions to prevent attacks of asthma. Sea voyages are sometimes beneficial and sometimes not. The decision as to whether or not benefit will be derived from certain regions may often be determined by a careful investigation into the condition of the patient's mucous membranes and the condition of his circulation.

Anything that would tend to make the circulation better in the mucous membranes of the upper air passages and diminish congestion and tumefaction of the mucous membranes of all the air passages will tend to prevent recurrences of asthma. Cardiac insufficiency, of course, should be properly treated, and whether the heart needs digitalis or the arteries need nitroglycerin or nitrites continuously, or whether the general good effect of ergot on the circulation is needed (and asthma may sometimes be prevented by ergot) must be determined by a careful study of the individual patient.

Insufficiency of the kidneys as a cause of asthma should be treated by the proper diet and the preven-

tion, if possible, of nitrogenous toxemias. Such asthma is an indication of nitrogenous poisoning. The asthma due to gout is often best combated with thyroid, and when there is insufficiency of the thyroid in young individuals, which may be recognized by well-known signs, such as amenorrhea or scanty menstruation in women, an unusual and undesirable increase of fat, a dry condition of the skin, and a tendency to nitrogenous poisonings, the asthma will be benefited by small doses of thyroid, perhaps, coincidentally administered with small doses of iodid, as iodid has been shown to be the most active stimulant of the thyroid gland.

TREATING THE PAROXYSM

The best treatment of the paroxysm of asthma must be decided by a careful study of each individual patient. There is no one best treatment for the asthmatic attack. The drug that most frequently is successful in rendering the patient comfortable and shortening the paroxysm is, of course, morphin, but before the physician begins the treatment of the asthmatic attacks with morphin he should have exhausted his other resources, as he is not sure that he can cure the asthma, even if he removes the reflex cause, and such patients readily acquire the morphin habit. If a given patient is incurable under the surroundings and conditions in which he must live and no other drug will relieve his suffering, he doubtless has the right to receive morphin, even if he does form the habit.

In endeavoring to abort or shorten the attacks we may have recourse to the narcotics, which relieve the paroxysm by inhibiting the reflexes and dulling the receptive centers. Such drugs are morphin, bromids, chloral, and chloroform by inhalation.

We may use drugs that dull the peripheral nerves and prevent their susceptibility to the irritation from which they are suffering and thus abort the paroxysm. Such drugs are mostly of the atropin group, as belladonna, stramonium and hyoscyamus. The effective action is atropin action, and doubtless atropin, and perhaps scopolamin (hyoscin) will do all the good that the crude drugs can do, although inhalation of the fumes from burning stramonium leaves has been used with success for centuries.

We may consider the treatment with such drugs as cause muscular relaxation by prostration. Such are emetics, and nicotin with patients who are not used to its action.

The next group of drugs whose action we consider in the treatment of asthmatic attacks are vasodilators. These drugs not only dilate the peripheral blood vessels and therefore relieve congestion in the mucous membranes of the respiratory tract, but also are preventers of muscular spasm. Such are, of course, the nitrites in the form of amyl nitrite, sodium nitrite, and nitroglycerin. The iodids will also cause lowered blood pressure, but are hardly of value during the attack.

Many times quite the reverse of this dilating, relaxing treatment is indicated in an asthma paroxysm. The vasoconstrictors are indicated, and if used in these instances will abort the attack. The best are solutions of epinephrin sprayed on the mucous membranes of the nostrils or throat, or into the larynx, or an epinephrin preparation in tablet form may be dissolved and absorbed in the mouth. The action is of course immediate, and sometimes so is the relief. For the nostrils epinephrin spray solutions of from 1 to 10,000 to 1 to 5,000 (diluting with a mild alkaline solution) may be used. In the throat and larynx a strength of 1 to 3,000 may be used. Digitalis is sometimes of advantage in these attacks even if there is no cardiac lesion or cardiac debility. Intramuscular injection of an aseptic preparation of ergot is also sometimes efficient treatment in stopping the paroxysm.

Citrated caffein, or strong coffee, or strong decoctions of tea are of benefit during the asthmatic attack in some individuals. The favorable action of caffein must be due to the cardiac stimulation and possibly to stimulation of the respiratory center.

Strychnin given hypodermatically has been much recommended for the asthmatic attack. While it generally fails, it sometimes does a great deal of good to patients who have bad heart action. A combination of strychnin, morphin, and atropin given hypodermatically sometimes seems to act better than when the strychnin is omitted.

INHALATIONS

Almost from ancient times paroxysms of asthma have been treated by the inhalation of fumes from burning medicinal substances. For this purpose the medicated substance may be in the form of cigarettes, powder, cones, or papers. Sometimes the fumes of these burning powders are directly inhaled, or the patient's bedroom is allowed to become filled with the fumes. Sometimes the attack is relieved by the inhalation of steam, or the vapor of boiling water in the room of the patient adds some relief. Sometimes liquid medicaments are added to boiling water in various apparatus for inhalation. Most popular, however, and most frequently used are the powders or papers, or pastils that are burned near the patient's face and inhaled directly.

Probably nearly all the powders or papers ordered by physicians for inhalation for asthma and almost all of the patented preparations and nostrums contain niter (saltpeter) and stramonium, or belladonna, or other atropin-containing drug. The action of the niter, i. e., potassium nitrate, fumes is to cause relaxation both of the blood vessels and of the bronchi. Papers are saturated with solutions of potassium nitrate, and when dry may be rolled in the form of a cigarette and smoked, or may be burned in any other form, and the fumes are beneficial to some patients. The addition of potassium nitrate to other medicinal powders causes them to burn more readily and give off their fumes.

Stramonium (leaves) is the most frequent form in which the alkaloid atropin is administered by inhalation. The action of the atropin thus locally applied is to dull the irritability of the peripheral nerves in the nose, throat and larger bronchial tubes, and thus by relieving irritation tends to relieve spasm. At the same time the atropin acts as a circulatory stimulant.

Various combinations of drugs are used for inhalation for asthmatics, many of which are nostrums (but have been analyzed) and have more or less efficiency in relieving the attack, because of the potent drugs often recklessly employed. The asthma nostrum vendor is looking mainly for immediate results, and he cares little what the danger to the patient may be or

how strong a dose he gives; consequently, he orders used sufficient amounts of the drugs to cut short the asthmatic attack. Therefore, the prescription which a physician is willing to write may not be so successful in a certain case as the nostrum temporarily may be.

One form of asthma cigarette contains the following ingredients.

| | |
|--------------------------|---------------|
| Belladonna leaves | 5½ parts |
| Hyoscyamus leaves | 2¾ parts |
| Stramonium leaves | 2¾ parts |
| Extract of opium | ⅞ part |
| Cherry laurel water..... | A sufficiency |

The dried leaves are cut small, mixed well, and moistened with the opium which has been dissolved in the cherry laurel water. A small amount of potassium nitrate is added in order that the cigarettes may burn readily.

Arsenical cigarettes also have been used by asthmatics, sometimes beneficially. Yeo says that "these are made by dissolving 15 grains of arsenite of potash in half an ounce of distilled water and saturating unsized paper with it. This is afterward dried, cut up into twenty pieces, each of which is rolled up into a cigarette. The smoke from the cigarette must be drawn into the bronchial tubes by a slow inspiration." It certainly is not obvious how arsenic can shorten an asthmatic attack. The administration of arsenic in small doses for some time may prevent the development of asthma, and chronic bronchitis is sometimes benefited by the prolonged use of arsenic.

Oxygen inhalations have sometimes been used by asthmatics, and with relief. This, however, is not very dissimilar to breathing the outside air, and will, of course, partly relieve the oxygen starvation. A patient who must go to the window and gasp for breath should, perhaps, have an oxygen tank in his room to use when he needs it.

If we were to sum up the best treatment for the paroxysm of asthma we must say morphin and atropin hypodermatically, the administration of nitroglycerin by the mouth, epinephrin into the nostrils or throat, or tablets containing epinephrin dissolved in the mouth, fumigations with potassium nitrate and stramonium, and cocain applications and sprays, if must be.

HAY FEVER

In this, as in most diseases, the aim is prevention, and before the periodic attack occurs, long before if possible, the patient's nose should be thoroughly examined for localized irritations and hyperesthetic areas, and these should be cauterized or removed as deemed best by the nasal specialist.

If, in spite of the building up of the general health and the local preventive measures, the attack of hay fever recurs, then before the date of the beginning of the disease the patient should if possible, go to a region where he has found that he is more or less immune. As the disease seems to be caused by the pollen or irritants in the atmosphere, produced or blown from various flowers and weeds, the ideal spot for these patients is one where there is little vegetation. Some patients do well in the mountains, some at the seashore, some on island resorts, some on sea trips. There generally can be found a region in which a patient is fairly immune, and to that he must resort annually.

If the attack develops, sedative measures, cleansing measures and general systemic treatment must all be inaugurated. Simple cleansing alkaline sprays give some relief. Many patients are made better with weak solutions of suprarenal, perhaps 1 part to 10,000 of the active principle of suprarenal in physiologic salt solution, or in an alkaline solution such as the liquor antisepticus alkalinus, diluted with an equal part of water, or in Seiler's tablet solution, each tablet being dissolved in 30 c. c. (2 fluidounces) of water. Such a suprarenal solution may be used repeatedly. It causes no habit and will generally give temporary relief. In a few instances the reaction from its use causes more or less congestion, and in such cases of idiosyncrasy it should not be used. Sometimes an ointment of epinephrin hydrochlorid in a pure white vaselin or petroleum (1 to a 1,000) is efficient in causing temporary relief. A drop or two of this is put into the nostril and the contraction of the mucous membrane from the absorption of the epinephrin is sometimes as great as when suprarenal spray is used and often more lasting. Epinephrin tablets, containing 0.002 gram, allowed to dissolve on the tongue, re-

lieve the congestion, especially in asthmatic cases, and will also relieve the asthma in these cases. Thin oil sprays containing adrenalin chlorid are also at times of value.

There is no justification for the use of cocain as a spray or application if it is to be used frequently in hay fever or in any other nasal condition. The danger of forming the habit is too great.

Antipyrin, quinin and various other local sprays have been recommended and used, but rarely are they of any aid in hay fever.

The administration of various pollen preparations and pollen serums have been tried sufficiently to warrant their recommendation, and occasionally a patient is benefited by such treatment. There have been many reports in recent medical literature regarding this method so that there seems to be reason for believing that when the correct pollen is found from which to make an extract, marked improvement may follow. Koessler (abstr. *Jour. A. M. A.*, Sept. 5, 1914, p. 890) found marked improvement in 33 of 41 patients. Openheimer and Gottlieb (abstr. *Jour. A. M. A.*, Feb. 20, 1915, p. 697) found 4 patients benefited and five cured in a series of eleven active immunizations.

Internally, the following drugs, although failing as many times as they benefit, should be tried in each case that is otherwise incurable, viz.: quinin, atropin, strychnin, antipyrin, iodids and thyroid.

Quinin is sometimes of benefit in large doses, rarely in small doses. Its action when helpful is similar to that in certain cases of urticaria, perhaps as an anti-toxin.

Atropin to be of value must ordinarily be given to the point of slight physiologic effect, such as dryness of the throat, increased rapidity of the heart, and flushing of the face. In susceptible individuals the pupils may also be dilated. The atropin treatment is certainly unpleasant, and minute doses are generally of little value. Occasionally a patient is benefited by $1/300$ or $1/400$ of a grain three or four times a day. Such treatment should be tried until it is found valueless.

Sometimes strychnin given in ordinary doses is of benefit. This is especially true in patients who are

much weakened, and have a good deal of passive congestion or sluggish circulation in the mucous membranes.

Antipyrin can only be of value when given in sufficient dose to act as an antispasmodic, much as it acts in whooping cough. It may possibly act as an antitoxin to the irritant from the pollen, and may be of benefit when there are asthmatic symptoms. The dose for an adult to be of value, must be 0.50 gram ($7\frac{1}{2}$ grains) three or four times in twenty-four hours. It is well to combine with this treatment the coincident administration of digitalis. If the condition is tedious and prolonged it would rarely be wise to give the antipyrin through the whole period of the disease. If patients suffering from this disease have weak acting hearts, digitalis may benefit them, unless they have some arteriosclerosis, in which case it is ordinarily better not to use it.

In some patients iodids in small doses act for good in causing increased secretion and preventing some of the intense swelling of the mucous membranes. In other patients the condition is made rapidly worse. Sometimes a very small dose of an iodid, as 0.05 gram (or 1 grain) three times a day, after meals, or a small dose of thyroid as 0.05 gram (or 1 grain) of the official thyroid powder three times a day will increase the secretion, dilate other blood vessels and relieve the local congestion. This is especially true in asthma and hay fever after fifty, and where there is gout.

Emmerich and Low (abstr. *Jour. A. M. A.*, Jan. 17, 1915, p. 247) report five cases in which a chronic tendency to hay fever was broken up and the patients permanently freed from its grip by continued treatment with calcium chlorid. The drug must be kept up for months, years, indefinitely, as it aims to remedy a constitutional defect—a disturbance, probably, in the functioning of the parathyroid bodies. They recommend all persons with a tendency to hay fever and even the healthy in regions poor in lime, or persons who do not take much milk or vegetables, to keep up the calcium chlorid indefinitely through years. Their experience of three and six years has confirmed, they say, the absolute harmlessness of the drug in the form advocated, while the general health is much improved,

persons tire less readily, they require stimulants less, they sleep better, are less subject to infectious diseases, catarrhal affections, bronchitis, etc., the vital processes become less sluggish, and waste is thrown off more readily and completely. They add that Metchnikoff's favorable results with yoghurt are probably due to the lime in the milk. The dosage they advocate is a teaspoonful of a 20 per cent. solution of crystallized calcium chlorid in distilled water, to be taken in a quarter of a glass of water in the course of the three principal meals.

As in asthma, the diet should be very simple. Any extra gastrointestinal irritation will certainly intensify the hay fever symptoms. For the same reason the bowels should be thoroughly moved daily, perhaps best by a gentle saline, as phosphate of soda.

Sometimes the hay fever manifestations are improved by treatment similar to that of uricacidemia, i. e., by a vegetable diet, one as free as possible from purin bases, and the administration of alkalies. The alkali may be potassium citrate or a similar drug. The benzoate of soda may be of value, and often small doses of effervescing Rochelle salt, as 1.00 gram (15 grains) three or four times a day, are of benefit.

DISEASES OF THE GASTRO- INTESTINAL TRACT

HYGIENE OF THE MOUTH AND TEETH

The things to be remembered in the care of the mouth and teeth may be summed up as follows:

1. Theoretically water should follow the milk of bottle-fed babies.

2. A soft cloth should be thoroughly moistened with a mild alkaline wash and frequently applied over the first little teeth of the infant.

3. No candy, or at least but little, should be given to young children, and as soon as their teeth have erupted they should have the more crunchy or granular cereals, and not so much of the soft, gelatinous cereals.

4. The teeth should be regularly cleaned by a dentist, at least once in six months.

5. All cavities, even small, should be filled, at least with temporary filling, so that the first teeth may be preserved as long as possible in order to develop the jaws properly, so that the second teeth need not be crowded.

6. The teeth of children and adults should be thoroughly brushed at least twice a day, better three times, with a proper brush, and, at least in the morning, with a tooth powder that is not too soapy, and at night with an alkaline mouth wash.

7. All persons, growing children or adults, should have all the tartar that may become deposited cleaned from their teeth once in three months, and examinations of the teeth once in six months will disclose cavities before they have become large ones.

8. If the teeth tend to degenerate and cavities quickly form, the trouble is generally with the nutrition, and the person is often deficient in bone-forming salts. Such patients should receive lime salts, phosphates, glycerophosphates, and iron.

The best iron preparations for this purpose are: tinctura ferri chloridi, 1 or 2 drops in a wineglass of

water or fresh lemonade, three times a day, after meals; ferrum reductum 0.05 gram (1 grain), in capsule, three times a day, after meals; ferri oxidum saccharatum (*Eisenzucker*), tablets, each 3 grains, 1 three times a day, after meals.

If the teeth are delayed in eruption and do not grow properly in young children, the dried extract of the thymus gland is of value. One of the tablets is given three times a day; it is best taken between meals, crushed with the teeth, and swallowed with water.

If the child as a whole does not grow well, even if not a cretin or in any way like a cretin, small doses of thyroid extract (*glandulæ thyroideæ siccæ*) in dose of 0.03 gram ($\frac{1}{2}$ grain) once a day, is of value, and this dose is sufficient.

In adults when the teeth tend to disintegrate perhaps the best treatment is the elixir of glycerophosphates of lime and soda, and it is also well to administer this preparation, or something similar, one or more times a day, to a pregnant woman, at least during the last months of pregnancy.

9. The care of the mouth during severe illness should be on the lines above described.

10. The proper care of the teeth will prevent Rigg's disease, one of the most troublesome and painful things that can happen to the jaws, meaning a retraction of the gums and exposure of the dentine of the teeth; proper care will also prevent that bane of older individuals, *viz.*, pyorrhea alveolaris.

11. The treatment of pyorrhea alveolaris must be strenuous and persistent. There is no excuse for its presence, and it can be eradicated. The treatment is persistent cleanliness and antiseptics, the same as in ozena. There is no excuse to-day for the horrible stench perpetrated by patients who suffer from ozena. The same is true of the nastiness of the breath of these pyorrhea patients, to say nothing of the danger to themselves of infection from germs harbored in the mouth. The treatment is a frequent use of a mouth wash of 1 part of peroxid of hydrogen solution to 4 or 5 parts of warm water, and then the persistent use of an antiseptic alkaline mouth wash and tooth paste or tooth powder after the peroxid of hydrogen has eradicated and removed the pus.

12. Before any serious operation is done about the mouth, and when there is no emergency, the teeth of the patient should be cleansed, cavities at least temporarily filled, and pyorrhea alveolaris, if present, cured, or at least properly kept in subjection.

FOUL BREATH

It is rarely excusable for a person having once discovered that the breath is offensive to neglect its prevention. Perhaps the most frequent cause pertains to the teeth. There may be cavities, or there may simply be a lack of cleanliness from an insufficient use of the tooth brush and proper tooth powders, tooth pastes or mouth washes. It is also necessary to remove with a toothpick particles of food which may have become fixed between closely set teeth. All cavities should be filled and tartar deposits should be regularly removed, not only because of their likelihood to cause disagreeable odor to the breath, but of the possibility of allowing germs to develop and be swallowed. If the stomach is not in a healthy condition and the gastric juice not normal, such germs may not be killed. The proper tooth powder should be determined by the ease with which the teeth are cleaned, some requiring more friction in the powder, and others requiring more soap. The choice of the powder and the frequency with which the teeth should be brushed is determined by the results. They must be kept clean, and the cleaning must be done at least twice a day—in the morning and at bedtime.

If there is any tendency to alveolitis, or if purulent alveolitis is present, then antiseptic, followed by alkaline, mouth washes should be frequently used until the condition is cured, but if it tends to recur, then such mouth washes should be used once a day, continuously. For a time weak peroxid of hydrogen solutions are beneficial, especially if the acid, which is formed after its oxidizing action, is quickly washed away with an alkaline solution. If gums are spongy a 5 per cent. solution of potassium chlorate makes an efficient mouth wash. One of the best local astringents and local antiseptics is a dilute solution (perhaps one part to five) of alcohol in water.

The teeth not being the cause of the odor of the breath, the tonsils should be examined, and not infrequently little calcareous deposits will be found in one or more crypts, or there may be a pocket of caseous deposit back of the tonsil. These should, of course, be removed and the crypts treated with some antiseptic solution and a cleansing antiseptic gargle given.

Another frequent cause of bad breath is postnasal or nasopharyngeal catarrh. If this is a chronic condition the treatment is tedious, and unless the patient thoroughly cooperates, results will be unsatisfactory. The proper treatment of nasal and nasopharyngeal catarrh can only be determined by a study of the individual condition. A warm cleansing solution is, of course, always important and the frequency of its use can only be determined by the rapidity with which the secretion forms deposits.

In atrophic rhinitis the odor is terrible, and, unfortunately, the condition is generally incurable; but there is absolutely no excuse for such a patient polluting the atmosphere of the rooms in which he works or lives. The odor can be prevented by the proper use of mild antiseptic and cleansing solutions, such as Dobell's solution. This solution is as follows:

| | Gm. or c.c. | |
|-------------------------|-------------|---------------|
| R Phenolis | 1 | m. xv |
| Sodii bicarbonatis..... | 3 | |
| Sodii Boratis..... | 3 | or aa gr. xlv |
| Glycerini | 10 | flʒ iiss |
| Aquae, ad..... | 200 | ad flʒ vii |

M. et Sig.: Use as an antiseptic gargle or as a nasal antiseptic spray.

Other causes of disagreeable breath are constipation and dyspepsia. The cause of these conditions should be treated, and as the tongue becomes clean and the pharynx less congested the breath will become better.

Laryngeal and bronchial inflammations and catarrhs, of course, are other causes of bad breath. If the condition is acute or subacute, it can soon be improved by proper treatment. If the condition is a chronic one, mild antiseptic inhalations will largely prevent the fetid condition.

| | | | | | |
|---|---------------------------|-----|------|----|-----------|
| R | Creasoti | 1 | c.c. | | |
| | Olei pini silvestris..... | 10 | | or | m. xviii |
| | Tincturam benzoini com- | | | | fl̄ iii |
| | positam, ad..... | 100 | | | ad fl̄ iv |

M. et Sig.: To inhale a teaspoonful from boiling water, one, two, or three times a day.

MOUTH-WASHES AND GARGLES

There are perhaps fifty mouth-washes on the market. They are all more or less similar in their composition, more or less multiple in their constituency, and more or less expensive, and represent more or less enormous profits to their owners. A number of pharmacopeial and National Formulary preparations have been developed to meet the need for mouth-washes and also to imitate some of the proprietary preparations.

Such polypharmacy as this is absolute nonsense. As in many pharmaceutical preparations, the value of the really useful ingredients is obscured by the useless shrubbery and weeds which surround them. A dash of this and a dash of that in these mouth-washes or gargles is simply playing to the galleries. Although it may seem a waste of time to criticize these simple and more or less harmless preparations, still, with the now recognized importance of oral cleanliness, it is as necessary to analyze our methods of procuring oral cleanliness as it is to note the efficiency of fumigation, and much of the latter is a delusion and a snare.

As antiseptic for the mouth and throat we cannot improve on the carefully localized applications of the tincture of iodine or of weaker solutions of iodine; when deemed advisable, of a strong solution of nitrate of silver carefully applied locally; or of local swabbing with strong hydrogen peroxid solution, or the more generalized washing or spraying with dilute solutions (provided that hydrogen peroxid is not applied to a deep ulcer or sinus where it can possibly cause disintegration of tissue). Strong preparations of glycerin and strong solutions of alcohol are other pleasant antiseptics, and the latter is decidedly astringent.

When a strong antiseptic is used, after it has acted for a few minutes, soothing washes or sprays should be used. Also it should be remembered that any simple cleansing wash (than which perhaps nothing is better

than simple salt solution in so-called physiologic strength, 0.9 per cent., or $\frac{1}{4}$ teaspoonful of salt to about half a glass of warm water to which may or may not be added another $\frac{1}{4}$ teaspoonful of sodium bicarbonate) is of value on an inflamed mucous membrane. After such cleansing of the membrane, the antiseptic may be directly applied, if such is indicated, or the cleansing and soothing gargle or mouth-wash just mentioned may be all that is needed. It is not the particular preparation that is used, or the particular ingredients in mouth-washes and gargles, but it is efficient washing and gargling that is of benefit.

The value of boric acid, not only in being mildly antiseptic, but also in promoting mucous secretion and therefore causing the easy removal of follicular exudates and membrane, should not be forgotten. Many times the insufflation of boric acid powder directly on the region involved is most efficient. At other times gargling of a solution in which boric acid is suspended is of value. While boric acid will dissolve in water only to about 4 per cent., a large surplus of boric acid should be left undissolved in the bottle. The bottle should be shaken, and the patient then gargles a boric acid solution which will deposit boric acid crystals on the throat, and will often be of as much value as though the powder were insufflated.

Perhaps the most pleasing pungent taste to the majority of patients is peppermint, and there is no reason for mixing this up with several other aromatics. If peppermint is disagreeable to a particular person, wintergreen may be substituted.

The following are formulas of a few simple solutions for mouth and throat washes:

| | Gm. or c.c. | |
|-----------------------------|-------------|---------|
| R Acidi borici..... | 2 | 3 ss |
| Potassii chloratis..... | 5 | or 3 i |
| Aquae menthae piperitae.... | 200 | fl 3 vi |

M. Sig.: Use as a gargle or mouth-wash, diluted or undiluted, as directed.

| | Gm. or c.c. | |
|------------------------------|-------------|-------------|
| R Sodii chloridi..... | | |
| Sodii boratis.....āā | 2 | 3 ss |
| Glycerini | 50 | or fl 3 iss |
| Aquae gaultheriae...q. s. ad | 200 | fl 3 vi |

M. Sig.: Use as a gargle or mouth-wash, diluted or undiluted, as directed.

| | Gm. or c.c. | |
|--------------------------|-------------|----------|
| R Acidi salicylici..... | 2 | gr. xxv |
| Glycerini | 25 | or fl3 v |
| Aquae menthae piperitae, | | |
| q. s. ad 200 | | fl3 vi |

M. Sig.: Use as a gargle or mouth-wash, diluted or undiluted, as directed.

The value of dilute alcohol washes, such as one part of alcohol to four or five parts of water, should not be forgotten. Alcohol is astringent, cleansing and antiseptic. Sometimes potassium chlorate solutions, though very disagreeable, are most healing when the whole mucous membrane of the mouth is more or less inflamed. If there are no pockets in which hydrogen peroxide may form bubbles and cause an extension of ulceration, there is no mouth-wash more antiseptic and more efficient than diluted hydrogen peroxid solution, as one part of hydrogen peroxid solution to three or four parts of warm water. Immediately after the use of hydrogen peroxid solutions a mild alkaline solution should be used to wash off the froth caused by the peroxid action and also to remove the acid irritation caused by such action.

If the mouth is dry during illness, some slightly pungent substance may be taken, to be either chewed or swallowed, such as some effervescing water, ginger ale, some pungent mint chewing-gum, or even a simple peppermint lozenge. Of course the value, in such conditions, of vegetable sours such as lemonade, orangeade or a piece of orange is well understood. These will increase the mouth secretions and prevent drying of the mucous membrane, which is such a frequent cause of ulceration.

Various preparations of glycerin diluted with water, with or without boric acid or borax, or boroglycerid, or milk of magnesia, are all valuable in preventing or aiding in the healing of a sore mouth.

If the tincture of iodine does not heal an ulcer or fissure, one or two applications of either the stick nitrate of silver or a 25 per cent. solution, applied by means of a swab, will generally cause healing.

If the patient is too ill for strenuous or perfect cleanliness of the mouth, as soon as convalescence is

established extra care should be given the mouth and teeth.

It should not be considered that a patient has been thoroughly examined until the condition of the mouth has been investigated. As before stated, too many chronic diseases have their source and continuation from diseases of the gums or from neglected, decayed teeth, to say nothing of diseased tonsils. A fetid, bad breath should always be investigated, as it is generally due to a chronic inflammation in the mouth. While a large portion of adults over 40 have more or less pyorrhea alveolaris, a large number of these patients may have the condition entirely prevented, and by various methods to-day many patients are cured of what was long considered an incurable condition.

The foregoing of course are only suggestions, and each physician should order the mouth-wash that he desires for his patient as carefully as he would write any other prescription. There is nothing wonderful or mysteriously curative in any of the formulas described, and simple home remedies will often be as effective as an expensive proprietary preparation, unless an antiseptic is required. Even simple starch water makes a very soothing gargle.

It is not our object to discuss the value of the various proprietary tooth-pastes. That the use of an antiseptic tooth-paste or an antiseptic mouth-wash, once or twice a day, will prevent acute infections that more or less enter through the nostrils must of course be denied. Strong antiseptic tooth-paste will not be tolerated by most gums, and it has been suggested above that one does not want the tooth-cleansing preparation too soapy, too irritant or too harsh.

If there is actual inflammation of the gums, medical or dental advice should be sought.

CARE OF THE TEETH

It has too long been believed that a serious illness caused of itself degeneration of the teeth, either cavitation or actual loss. While there are many of the elements of nutrition that are needed for the teeth to remain healthy, neglect of the mouth and teeth is probably the larger factor in their degeneration. Tartar forms, inflammation begins and pus-pockets

develop around the teeth when they are not properly cleansed and the gums are not properly cared for.

If the patient is so ill that he cannot allow brushing of the teeth either by himself or by the nurse, the gums and teeth should be cleansed by rubbing or spraying with the liquids selected. A great source of cleanliness for the teeth is chewing, which is more or less in abeyance during serious sickness, but we are learning that in most of the prolonged acute diseases the patient is able and willing to chew such simple thing as dry toast. This alone cleanses the teeth, starts the saliva and normal mucous flow, and frequently offers a better food than the constant swallowing of even nutritious liquids. If the ordinary simple cleansing lotions are not sufficient to prevent the formation of pus or ulcerations, various applications to the regions of trouble should be made, and perhaps none is better than the tincture of iodine, or, if that is considered too severe, a modified solution of iodine as follows:

| | | Gm. or c.c. | | |
|---|----------------------|-------------|----|---------|
| R | Iodi | 1 | or | gr. xv |
| | Potassii iodidi..... | 3 | | gr. xlv |
| | Glycerini | 30 | | ℥ i |

M. Sig.: Use externally as directed.

Gies (*Household Arts Review*, May 1913, p. 12) has found that so-called antiseptic mouth-washes and alkaline washes do not wash off or dissolve this adherent mucin, and therefore are not effective in preventing decay of the teeth. He quotes Pickerill and a discussion in the New York Academy of Medicine (*Jour. Allied Dental Soc.*, 1912, VII, 397) and Dr. Howe and records his own investigations to show that the vegetable acids, such as diluted vinegar and the fruit juices and their acids, are the most successful cleansing substances that can be used on the teeth. These investigators all state that a diluted vinegar is perfectly successful as a cleanser of the teeth. They also believe that starches and sugars should never be eaten alone, but should be certainly followed by some acid substance, as some of the acid fruits or some of the vegetable sours. After most meals, therefore, it is good sense to eat a little fruit, and on going to bed

perhaps the most successful cleanser of the teeth is a little sour fruit or diluted fruit vinegar.

Children and patients should also be taught to brush the gums as well as the teeth, and when it is needed a patient should be taught to massage the gums. The use of wooden toothpicks to remove particles between the teeth that cannot be removed by the tooth-brush should be approved.

Many patients' teeth are so close together that particles of food remain lodged between them and cannot be removed in any other way. Dental floss should certainly be used occasionally, or frequently, if possible. If inflammation actually occurs in the gums or around a tooth, the advice and care of a dentist are needed.

PYORRHEA ALVEOLARIS

Recent investigation appears to have demonstrated that *Endameba buccalis* stands in some etiologic relation to pyorrhea either as a germ invading the space between the gum and the teeth and causing the condition known as pyorrhea alveolaris, or playing a secondary rôle invading a cavity already formed as a commensal parasite and greatly aggravating the existing condition. It has further been shown that ipecac and its alkaloid, emetin, exercise a specific influence over the *Endameba buccalis*, which disappears promptly from the alveolar pus pockets when emetin is given hypodermically. The destruction of the endameba is only temporary, however. Reinfection occurs not infrequently at the end of ten to fourteen days. Prophylaxis of pyorrhea is to be distinguished from the prophylaxis of the degeneration of the alveolar process known as interstitial gingivitis which is due to constitutional causes. Whether this separation of the gums from the teeth has occurred or not cleanliness of the gums and teeth especially at the gum margin should be carefully observed.

The employment of iodine on the gums is both antiseptic and stimulating to the tissue of the gums which becomes firmer under its use. Talbot describes this use of iodine as follows: A mixture which he calls iodoglycerol consisting of zinc iodid, 15, water, 10,

iodin, 25 and glycerin, 50 is applied with cotton wound around wooden applicators to the gum margins above and below. The lips and cheeks are held away from the jaws until the iodin has dried. These applications should be made every day and continued until the patient is dismissed.

The treatment of pyorrhea consists first in the removal of tartar which, accumulating between the gums and the teeth, separates the two and presents a cavity for the invasion of germs. Solution of peroxid of hydrogen may be used as a mouth wash.

The demonstrable endamebas can be destroyed by giving $\frac{1}{2}$ grain of emetin hydrochlorid hypodermically for three to six successive days. Apparently equal endamebacidal effect is produced by two or three Alcresta ipecac tablets (Lilly) taken by mouth three times a day for four to six successive days. The lesions require variable lengths of time to heal, but many could not reasonably be expected to heal in less than several weeks or months. The treatment must be repeated from time to time until the lesions all heal, on account of relapse, or probably reinfection of the lesions as a result of the great prevalence of the infection. Injecting ipecac or emetin into the worst lesions ought to be of service and can be carried out by patients in many instances. Rinsing the mouth thoroughly with a solution of fluidextract of ipecac is believed to protect, to some extent, against reinfection, and may cure the disease in its earliest stage in some instances.

The importance of adequate dental assistance in pyorrhea cannot be overestimated.

THE EXAMINATION OF STOMACH CONTENTS

Test Meal.—The object of the test meal is to show the state of digestion. For this purpose a meal consisting of ordinary food is most appropriate. It has recently been suggested that gastric secretion is sufficiently stimulated by ordinary water and in this way the gastric juice can be secured in a state of great purity, especially fit for chemical examination. While this is true such a meal does not indicate how the stomach deals with ordinary food. For the latter purpose the test breakfast of Ewald has long been

used and has proved itself very serviceable. It should be used as a routine. It consists of bread and tea or bread and water. The amount of bread should be from 35 to 50 gm. No butter, sugar, milk or spices are used. The amount of bread can be supplied by two slices of bread, a roll, or five ordinary soda crackers. The amount of tea should be two ordinary cups approximating 400 c.c. or a pint.

The meal should be taken on an empty stomach, before breakfast or in place of the noon meal. The latter time has the advantage that in case of motor insufficiency remains of the breakfast may be found in the stomach contents. In this case it is well for the patient to eat some article of food for breakfast that can be easily recognized. The test meal should be tastefully prepared and tastefully served. Such table accessories should be furnished as will make it as attractive as possible. Preparations for the removal of the contents should be made without attracting the attention of the patient. The time for removing the contents should be reckoned at one hour from the time of beginning the meal.

In some cases this time may prove too long because the lack of acid permits the contents to leave the stomach prematurely and no contents are brought back through the tube. In such a case the meal should be given again and the contents removed at the end of forty-five minutes or even a half hour.

Removal of Stomach Contents.—The technic of removing stomach contents is simple. The patient should be covered with an apron to protect the clothing; the physician may also find it advantageous to wear a gown. A shallow basin should be provided to receive the contents; a better arrangement is a stout glass jar known as a celery jar which should be placed in a larger basin. It is well to suggest to the patient to hold the basin with his hands. This serves to keep the hands occupied and tends to lessen the tendency of the patient to pull out the tube. The patient should be assured that the operation will not hurt; at the same time it is best to admit that it will be disagreeable and especially that it is apt to give a sensation of difficulty in breathing, but that this will disappear if the patient breathes regularly through the nose. The

tube to be used is a simple tube with one lateral opening and one at the end. To the upper end a short piece of rubber tubing is attached by a connecting short piece of glass tubing and the shorter tubing is attached by a piece of hard rubber to a strong walled bag like a Pollitzer bag. This serves as an aspirator to remove the contents by suction.

The tube is introduced by the hand of the operator holding it like a pen. It is not necessary for the hand to enter the mouth. The operator should stand partly behind the patient and may steady the patient's head with the left hand. When the tube has entered the stomach the contents may flow spontaneously; if not the flow may be stimulated by moving the tube up and down which excites some nausea. If the contents are not easily obtained the aspirator should be emptied of air and attached. When it is allowed to expand the contents will flow into the bag and can be emptied into the receptacle provided. The temptation will sometimes arise to facilitate the removal of contents by injecting water. This defeats the object of the removal as the contents obtained is practically worthless even for qualitative tests. At the termination of the process the patient should be warned against spitting in the dish containing the contents. He may spit in the outer basin.

Examination.—The stomach contents should be measured. The contents ordinarily secured varies from fifty to one hundred and fifty cubic centimeters; a quantity above 150 c.c. is indicative of one of two things: either there has been a retention of food remnants on account of motor insufficiency or a hypersecretion of the gastric juice has occurred. The chemical examination will usually determine this question.

The macroscopic examination of stomach contents is perhaps of more importance than the laboratory investigation. For this reason the physician should remove the contents himself. The contents should be poured into a clean basin and poured back again into the original dish. The color should be noted. A greenish color may indicate admixture with bile; it is also sometimes due to a growth of mold or other fungi. Mucus will be recognized by the stringiness

of the contents which is readily seen as the liquid is poured from one vessel to the other. Mucus may be swallowed from the throat or possibly from the chest. Such mucus is light and frothy, or in lumps which float on the surface; stomach mucus clings to the vessel and is intimately mixed with the other contents. Blood may be readily recognized, but is of minor significance; it is frequently shed by the mucosa which has been injured by the tube. The mucosa is especially liable to suffer such injury in achylia gastrica. The condition of digestion is easily observed by the appearance of the remnants of the roll. If digestion is good the gluten of the flour is digested and the starch sinks to the bottom as a fine sediment. If the digestion is imperfect the roll is coherent and in case of total lack of acid the bread appears as if it had just been swallowed or it may be enveloped in glairy mucus. Occasionally small pieces of mucous membrane will be found which have been stripped off by the tube.

Having noted these striking characters one should proceed to the chemical examination. Usually it is not necessary to filter the contents. A piece of congo paper may be dipped into the contents; if free acid is present the red paper changes to blue. A piece of tropeolin paper will turn brown if free hydrochloric acid is present and on drying this at a gentle heat the color will change to a violet. This is usually sufficient to demonstrate the digestive power of the mixture. One proceeds at once to the titration of acids for which a determination of the free hydrochloric acid and the total acidity are sufficient for routine examinations. 10 c.c. of the contents are measured, most conveniently in a 10 c.c. graduated cylinder and poured into a small beaker glass. It is well before reading the amount in the cylinder to remove any mucus floating on the top by means of a pair of small forceps and fill up to the mark with clear fluid. After emptying the cylinder it may be rinsed with distilled water and the rinsings added to the fluid in the beaker. This is then titrated for free HCl by running in from a burette decinormal sodium hydroxid solution with dimethyl-amino-azobenzene as an indicator until the red liquid becomes orange yellow (not lemon yellow). The reading of the burette is then taken and one or two drops of

solution of phenolphthalein are added to the liquid in the beaker. The alkali solution is then run in until the liquid shows a distinct tinge of pink after stirring. This gives the total acidity; both readings are taken from the zero point and the figures multiplied by ten to get the amount of alkali required to neutralize acid in 100 c.c. of stomach contents. These figures are customarily used in reports and are designated as the degree of free and total acidity.

The tests described above consume little time (not more than fifteen minutes for one accustomed to the work) and may suffice for the examination in the majority of cases. Some other tests ordinarily described, are not needed in ordinary clinical work because their results can be predicted from the results of tests already made. Among these may be included the following. Tests for the digestive action of the saliva are unnecessary because we may assume with fair certainty that starch digestion will be poor in the presence of high acidity, fair with normal acidity, and very good with low acidity. Tests for the presence of pepsin are unnecessary unless there is no free hydrochloric acid. In the absence of hydrochloric acid the presence and amount of pepsin should be tested for. Tests for lactic acid are quite unnecessary when there is free hydrochloric acid. When hydrochloric acid is very deficient or absent lactic acid should be tested for. If the total acidity is as low as 8 the probability of achylia gastrica may be assumed.

Microscopic Examination.—For examination with the microscope a drop of the contents is placed on a slide and examined with a low power. It can advantageously be stained with a weak Lugol's solution. Starch is colored blue, proteins yellow, and some bacteria blue. The objects of interest are Oppler-Boas bacilli, long bacilli often bent on themselves, sarcinae masses of cocci aggregated in groups of eight with divisions between the individual cocci which cause the mass to look like a fleece of wool, yeast cells and starch granules.

EXAMINATION OF FECES

The examination of feces is of little value so far as the diagnosis of indigestion is concerned unless a definite diet is prescribed so that one may know what

appearances the residues of the food should present under normal conditions. The original test diet of Schmidt was devised so as to conform to German dietetic customs and is ill adapted to American habits. Several modifications of this diet have been proposed among them the following menu by Dr. M. M. Scarborough.

Breakfast:—One soft boiled egg, 2 slices of toast with butter, 1 bowl of oat-meal with sugar and cream, 1 glass of milk, and 1 cup of coffee. If coffee is not desired, another glass of milk may be substituted.

Dinner:—A quarter pound of finely chopped round steak (very slightly broiled so that most of it is rare) $\frac{1}{2}$ pound of mashed potato, 2 slices of white bread or toast, plenty of butter, and 1 or 2 glasses of milk.

Supper:—Same as the breakfast.

A patient is put rigidly on the above diet for three or four days. At the beginning of the diet he is given a tablet or capsule containing 0.30 gram (5 grains) of pure willow charcoal. This dose of charcoal is repeated at the end of the diet. The consequent black stools from these two doses of charcoal will mark the beginning and end of the period of special diet. The length of time it takes the charcoal to go through the intestines will determine their activity and whether the food is delayed or not in its passage through the alimentary tract. The second dose of charcoal is useful only to determine whether the activity of the canal has changed during the rigid diet. The stool which is to be taken for examination should be at the end of the third 24-hour period of the diet and before the administration of the second dose of charcoal. The stool desired may be collected in a wide mouthed jar or what is more convenient for the ordinary examination, a sample may be transferred to a glass ointment jar and transmitted to the laboratory for examination. The examination may be divided into macroscopic, microscopic and chemical.

Macroscopic Examination.—Macroscopically, under normal conditions, we find a soft-formed stool, light-brown in color and of uniform consistency. A liquid stool usually denotes a too rapid passage of food through the tract; a tarry stool indicates blood coming

from the stomach or high up in the intestine. Flakes of mucus, blood, pus, etc., are pathologic. Next a piece of feces the size of a walnut is ground up in a mortar with a little water and then spread out on a glass plate in a thin layer. The plate should be placed over a sheet of paper half of which is white and half black. The normal feces appear perfectly homogeneous except for here and there small broken, brownish points of cellulose from the oatmeal eaten. In this preparation may be seen food remains which are abnormal. Firm whitish or yellowish strings of connective tissue, and small brown-colored rods of muscle fibre, appearing like splinters of wood, may be seen here and there, denoting improper indigestion of the meats. Starch granules in the form of glassy transparent globules like sago grains, may be present and must be distinguished from shiny, ragged flakes of mucus.

Microscopic Examination.—The microscopic examination is very simple. A small mass of feces is pressed out in a thin layer on a slide by means of a cover glass. A little water may be added if necessary. Normal excrement from the test-diet appears as a fine detritus of granules, globules and bacteria interspersed here and there with fragments of muscle fibers, small, irregular, yellowish flakes of calcium salts and less numerous skeletal remains of potato cells, besides the chaffy particles from the oatmeal. On a second slide a small piece of feces is stirred up with two drops of a 35 per cent. solution of acetic acid, heated over a flame until bubbles arise, and then set to cool. The process causes a liberation of the free fatty acids which flock out on the surface of the preparation, giving a rough index to the amount of fat in the stool.

On a third slide an iodine solution (liquor iodi compositus, Lugol's solution, diluted with equal part of water is used, which stains the starch, yeast and other fungi that may be present. The microscopic examination may reveal the following pathologic components: fragments of muscle fibres large in size and in good state of preservation; clusters of undigested starch grains; numerous needles and crystals of fatty acids and soaps; and occasionally various fungi.

Chemical Examination.—The chemical tests are very simple. The litmus reaction is taken; normal stools are faintly alkaline or at least feebly acid. Next a little of the stool is mixed with a strong bichlorid solution (a saturated solution of corrosive sublimate in water, which is, in cold water, not far from 7 per cent.); normal feces give a red reaction, while feces that have passed through the tract so rapidly that the bile has not been reduced give a greenish color. The greenish color is abnormal and shows that unchanged bile pigments have passed entirely through the intestinal tract. The last test is the amount of gas that the stool will give off. An acid stool with an excess of carbohydrates will ferment if kept warm and give off considerable carbon dioxid; on the other hand a stool which gives an alkaline reaction and contains much unabsorbed protein will readily undergo putrefaction and evolve ammonia and hydrogen sulphid. The gas from decomposing feces can be collected by filling a large test tube with diluted feces and inverting the tube over water in a shallow dish and placing in an incubator for a day or two.

Pathologic Findings.—The significance of pathologic findings are briefly as follows:

Mucus in the stool means inflammation of the colon or rectum. Rarely it may come from the small intestine. A green color with the bichlorid test indicates a very rapid passage of intestinal contents. Absence of bile pigment denotes complete obstruction of the biliary duct. The pigment may be obscured by excess of fat, which should be removed by ether before a final opinion as to the absence of biliary pigments should be expressed.

The finding of meat remains is of great significance. Connective tissue never appears in the feces after the test-diet unless there is disturbance of digestion in the stomach, a diminished gastric juice. Muscle fibers are not digested in the stomach, but in the intestine. Even in complete achylia gastrica the muscle fibers may be completely digested leaving the connective tissue skeleton of the meat unaffected. The presence of muscle fibres in a good state of preservation always means trouble in the small intestine, due to one or

more of the following conditions: the pancreatic juice may be insufficient; or the active enterokinase of the secretions of the small intestine may be absent; or finally, there may be a marked hypermotility, too rapid peristalsis, of the small intestine, thus not allowing time for digestion of these elements. A method for the investigation of the exact cause of intestinal indigestion of meat fibers has not yet been satisfactorily worked out. However, as the nuclei of tissue cells are digested only by the pancreatic secretion, Schmidt has devised his nuclei test which consists in giving a small cube of meat placed in a small porous silk bag. The bag almost always contains remains of the tissue after passing through the gastro-intestinal tract. If undigested nuclei are present, it is safe to conclude that there is an unsatisfactory functioning of the pancreas.

The presence of starch elements indicates its incomplete digestion in the small intestine and shows a disturbance of the pancreatic secretion and of the intestinal juice. Insufficiency of starch digestion is further confirmed by the fermentation test and by the finding in the stool of organisms that stain blue or violet with iodine.

In the feces of constipated persons, as a rule, there are few food remnants, few bacteria, and water has been largely absorbed rendering the feces dry and hard. Digestion in the constipated may be said to be too good.

DIAGNOSIS AND TREATMENT

The diagnostic findings and the indications for treatment may be summed up as follows:

1. If the charcoal is slow in passing through the alimentary canal, i. e., more than thirty-six hours after ingestion, intestinal peristalsis is sluggish.
2. If the fecal matters are very dry, there is too great absorption of liquid from the intestines.
3. If the stools are very liquid, there is generally too rapid peristalsis.
4. If the fecal matters are distinctly or very acid, there is an imperfect intestinal digestion.
5. If there is much gas in the feces, there is maldigestion of some kind; it may be purin maldigestion or carbohydrate maldigestion. Whichever it is other-

wise determined that it is, that particular kind of food should be limited.

6. If there is undigested connective tissue found microscopically, the trouble lies in the stomach, which should then be studied by means of the test breakfast and examination of the stomach contents withdrawn an hour after the test breakfast has been taken. If there are undigested muscle fibers present, there is insufficient pancreatic secretion, and meat should be diminished or temporarily withdrawn from the diet.

7. If there is a large amount of undigested starch particles, the pancreatic juice is deficient, at least in its starch digestion properties; consequently the starch in the diet should be diminished.

8. If the bile pigments are absent, of course the bile is not secreted (or excreted) into the alimentary tract. If there is a large amount of fatty acids, or if there is a large amount of fat in the stool, it shows deficient bile secretion, and the amount of fat ingested should be greatly diminished.

9. Abnormal bacteria, or an abnormal amount of bacteria, or specific bacteria would suggest various diets, bowel antiseptics, purgings, and various systemic treatments, depending on the findings.

10. Much mucus or pus would suggest the treatment, depending on the region from which it was supposed to come; colon washings or colon treatments, if the colon was at fault.

11. If there is blood in the stool, evident or occult, it must be determined, if possible, from what part of the tract it comes.

THE FINDING OF PATHOLOGIC OVA

Fauntleroy and Hayden (*Abstr. Jour. A. M. A.*, Feb. 13, 1915, p. 620) have devised a method which consists essentially of staining the fecal matter with anilin gentian violet. This solution stains everything on the slide except the eggs. It does not penetrate the membrane about the eggs and they are therefore left in a natural state. None of the other ordinary colored stains will do this. The entire slide with the exception of the real eggs is stained violet. This method of examination has been used in the exam-

ination of over a thousand stools with uniform success. All eggs, hook-worm and others, stand out very clearly and beautifully. About 2 gm. of the fecal material are thoroughly mixed with 5 c.c. of a 2 per cent. aqueous solution of compound solution of cresol in a centrifuge tube. The specimens are centrifugalized at high speed for one minute, the supernatant liquid is then decanted and fresh compound cresol solution added and mixed with the sediment in the tubes. This operation is repeated three times. On completion of the centrifugalization process a small portion of the bottom sediment is removed with a clean pipette and placed on a clean slide, a small drop of anilin gentian violet mixed with the sediment, and a clean cover-glass placed on it.

INTERPRETATION OF SYMPTOMS REFERABLE TO THE STOMACH

There is perhaps no group of symptoms regarding which there is more misapprehension among physicians than symptoms arising from the stomach or felt in the region of the stomach.

INDIGESTION

Indigestion is a much abused term commonly used to cover all forms of stomach disease. Strictly it means the non-digestion of food. This is a rare event among those who are not seriously ill. That digestion may fail in the stomach or in some other part of the alimentary canal or that some parts of the food may escape digestion is common enough, but the human organism is provided with compensating mechanisms so that if one organ in the digestive system fails to perform its duty another is usually capable of taking its place. As a rule in adults, even in the case of those who complain of trouble with the stomach or bowels, only a minimum of the food ingested escapes digestion or fails to be absorbed. The test of digestion is found in the state of the bowels; if the bowels act normally or are constipated as a rule the digestion is complete and may indeed be too good. If there is diarrhea it may be assumed that digestion is imperfect, although there may be no lesion of the stomach or

intestines. We may repeat that indigestion is not a common symptoms in the ordinary chronic affections of the stomach and intestines. As a corollary of the above we may affirm that digestive ferments are not often lacking and there is rarely a rational indication for prescribing artificial ferments to supply a lack in the normal action of these organs. Such drugs should be prescribed only after their deficiency has been shown by the proper tests.

THE IMPORTANCE OF STOMACH DIGESTION

It is not desirable to over-rate the importance of the processes going on in the stomach in the final process of digestion. The stomach is a preparatory digestive organ. It is a reservoir which reduces the food to a fine state of subdivision and renders it suitable for the subsequent action of the secretions of the liver, pancreas, and intestines. Its work is seldom complete. The organ may be removed or fail to perform its functions without any serious disturbance in nutrition. Nevertheless one cannot deny that changes in the utilization of food may occur in the absence of the correct function of the stomach which, in the long run, may seriously affect metabolism and nutrition. In this connection we may note some peculiarities of the motor action of the stomach which have important bearings on treatment. The stomach does not absorb water and hence in case a liquid which needs no digestion is taken, even at meal time, a special channel is formed along the lesser curvature by which the liquid is conveyed to the intestine without mingling with more solid undigested contents of the stomach. The taking of liquids at meal time does not, therefore, dilute the gastric juice as was formerly taught. Such an event may happen, however, when the stomach is atonic and allows water or other liquid to flow into the lower part instead of conducting it into the intestine in a normal manner.

RELATION OF THE STOMACH TO OTHER ORGANS

It should always be borne in mind that the stomach has important nervous connections with other organs by which it reflects like a mirror events taking place in other parts of the digestive system. Symptoms

apparently arising in the stomach may, in reality, depend on disease of the liver, gall-bladder, appendix, or lower bowel. Neighboring organs not connected with the process of digestion or even remote organs may produce a reflex disturbance in the stomach. A very large part of the disturbances of the stomach are of psychic origin. The physician should always interpret the symptoms presented by the patient who thinks there is something wrong with his stomach in the light of possible disease of other organs or of mental disturbances. Even in the presence of proved organic disease the possible influence of emotion in producing symptoms should not be forgotten.

THE MAJORITY OF STOMACH CASES FUNCTIONAL

While the existence of serious organic disease should never be overlooked it is well to understand that only a small proportion of patients who come to the physician complaining of the stomach or of digestive disturbances have ulcer or cancer. The physician should not make or suggest a diagnosis of serious disease until he has proved its existence by appropriate physical and laboratory examinations.

SYMPTOMS NOT CHARACTERISTIC

Diagnosis on the basis of the patient's recital of symptoms without physical examination or the analysis of a test-meal or of the feces is much too common. It may be said at the outset that there exists scarcely a symptom that is characteristic of any definite stomach disease. This may explain the readiness with which practitioners resort to such terms as indigestion, dyspepsia, catarrh of the stomach or the indefinite term "stomach trouble" to explain their diagnosis to the public. Relying on the symptoms they cannot have exact knowledge of the condition present. In many cases it may be said that a stomach specialist could do no better. Specialists have often been mistaken in their impressions gathered from the recital of the symptoms and assumed the existence of a hyperchlorhydria only to find on exact examination a total lack of acid in the stomach contents. The importance of laboratory diagnosis is thus clearly

shown and it may be assumed almost as an axiom that a diagnosis of stomach disease based on the symptoms alone is little better than guess-work.

THE RARITY OF FERMENTATION IN THE STOMACH

Formerly it was a favorite custom to explain the belching of gas from the stomach and the flatulent distention of the organ as also the "sour" stomach, by saying that these symptoms arose from the fermentation of the food. Such an explanation gave rise to attempts to suppress fermentation by giving a host of antiseptics, some of powerful and some of feeble germicidal power. This explanation and the practice based on it arose from the application of a chemical theory without sufficient regard for the actual conditions prevailing in the stomach. The contents of the stomach are at times subject to fermentation with the production of a certain amount of gas. Lactic acid may be formed by fermentation but usually no gas is formed with it; butyric acid may occur in stomach contents and its formation is accompanied by the evolution of some gas; yeast fermentation forms gas at times. However, if one will watch one of these fermenting liquids he will find that ordinarily the formation of gas is slow and quite insufficient to account for the belching that many patients experience. These occasional sources of gas account for its accumulation only in rare cases. In the majority of cases the gas present in the stomach consists of swallowed air. As a rule even in cases in which much distress is produced by flatulence or belching there is no fermentation in the stomach. The swallowing of air may be a habit of voluntary origin or it may arise from the forcing of air through an atonic cardiac orifice by the force of expiration. The acid present in the stomach contents is seldom the result of fermentation but is produced by oversecretion of the gastric juice. It is well, therefore, to ascertain the true origin of these symptoms before attempting to prevent them by the administration of injurious antiseptics.

ACUTE DYSENTERY

Acute dysentery is an inflammation of the large intestine, throughout either the whole or a portion of its extent. Sometimes the lower part of the small intestine is coincidentally inflamed. The disease may be due to various irritants of microbic or parasitic origin, giving essentially similar symptoms but requiring different treatment addressed to the cause of the disease. As Matthieu remarks we should not speak of dysentery but of "dysenteries" as there are several kinds of dysenteric colitis. It is, however, convenient to discuss the symptoms and general treatment in common for the different varieties and then take up the specific treatment of the different forms.

The disease is characterized by mucus, blood and purulent discharges from the rectum, accompanied by much straining, colicky pains and tenesmus. The following classes of dysentery may be noted: bacillary dysentery, amebic dysentery, balantidium dysentery, and dysentery arising from some unknown infection. The disease is, therefore, infectious and may be transmitted by the discharges or articles contaminated with them. It occurs in epidemics and also sporadically. When dysentery occurs sporadically it is generally more amenable to treatment.

SYMPTOMS

The general symptoms of acute dysentery are mild fever, a variable pulse, at times rapid or weak from exhaustion, with a tendency to collapse turns; the movements are frequent and exhausting. The nearer the rectum the inflammation is, the more intense is the tenesmus and the more constant the desire to strain, with resulting small movements and but little relief. The higher up the inflammation is in the large intestine, the more frequent the griping and abdominal pain. The stools consist of large masses of mucus mixed with feces and later mucus, more or less blood-streaked, perhaps without any fecal matter at all. Later, slight hemorrhages occur, depending on the amount of ulceration or erosion of the membrane, and finally pieces of membrane are passed similar to diphtheritic membrane. The tongue is coated, but gener-

ally moist, unless a large amount of fluid is lost. If the progress of the disease is unfavorable, the temperature is likely to rise higher, otherwise it remains low. If the disease long continues and the movements are frequent and profuse, a typhoid state develops.

GENERAL PRINCIPLES OF TREATMENT

It is evident that the first steps in the treatment are rest, the removal of irritants, and the giving of most easily assimilable nourishment. These principles apply to all forms of dysentery. The patient should be put to bed and the use of the bed pan insisted on. If the condition of the patient will permit the rectum should be inspected with a speculum or with a proctoscope and a piece of mucus or a scraping from an ulcer if any are visible obtained for examination. This should be examined immediately on a warm slide for amebae which are recognized by the ameboid movements. If no amebae are found the mucus and feces should be examined bacteriologically for other causes of dysentery. Following this examination the rectum and colon should be irrigated with physiologic saline solution or a solution of methylene blue may be employed. After the fecal matter and mucus have been washed away and the water is returned clear, the colon may be treated with a weak permanganate of potassium solution, 1:10,000, or peroxid of hydrogen solution 1:8 may be used. In making these irrigations the tube should not be pushed too far, which might increase the injury to the rectum. A few inches is sufficient. Such irrigations may be repeated once a day in the early stages.

The Diet.—The diet should consist of milk and water, albumin water, rice water bouillon, beef juice or other suitable liquid food. If the tongue is coated, the other foods mentioned agree better than milk, but if the tongue is clean give milk either alone or diluted with some of the other foods. The food must be neither hot nor cold. Lemonade, tartaric acid lemonade, or imperial drink should be given. Milk predigested with pancreatin may obviate the tendency to the formation of an undue amount of intestinal gas.

If milk is desirable but is distasteful, it may be diluted with Vichy; or the milk may be given hot and salted. The milk given must be known to be pure and uncontaminated. If there is doubt, it must be pasteurized. Tea and coffee may be allowed at such times of the day as not to disturb the sleep. While large amounts of water are inadvisable and iced water should not be given, still, if much water is lost by the stools, the amount must be equaled by that which is ingested; otherwise the patient's tissues lose water, the blood-vessels lose water, the urine becomes concentrated, the skin dry, and the patient suffers from this deprivation of water, and such a condition alone may be the cause of death. Preferably, liquids or foods should be given hot, as anything cold entering the stomach is likely to start peristalsis. It may be advisable to give some thin cereal gruel once a day, at least if the disease lasts more than a week.

As soon as convalescence is established, broiled lamb chops, roast beef, and the white meat of chicken may be added to the diet. All solid food should be thoroughly masticated and the digestion may be hastened by giving a few drops of hydrochloric acid directly after meals. As convalescence progresses favorably, toast, stale bread, and boiled rice may be added to the diet, and later baked potatoes. The first fruit that is allowable is either lemon or orange juice.

MEDICINAL TREATMENT

It is generally advised to give at once a dose of castor oil and follow it by small doses of calomel with additional laxative treatment in the form of saline laxatives if necessary. A good form of laxative is magnesium sulphate given in saturated solution in teaspoonful doses hourly. The following prescription is sometimes efficient in arresting milder forms of dysentery of unknown causation.

| | Gm. or c.c. | |
|-----------------------------|-------------|-------------|
| R Magnesii sulphatis..... | 25 | ℥ i |
| Acidi sulphurici aromatici. | 10 | or flʒ iiss |
| Syrupi zingiberis..... | 50 | flʒ ii |
| Aquae | ad 100 | ad flʒ iv |

M. et Sig.: One teaspoonful in water every four hours.

This will have a laxative effect with a secondary astringent effect, due to the sulphuric acid.

Bismuth subcarbonate may be administered in large doses, but the value of this is often problematical. However, if the inflammation is in the cecum or has migrated into the ileum, the bismuth is probably of value. Bismuth, however, must not be too long continued, as it tends to form scybalous masses and cause more irritation and more inflammation.

Pain should be relieved if necessary by opium. The tendency to tenesmus can be relieved by local applications of cocain or one of its substitutes, or atropin (extract of belladonna).

Kaolin or bolus alba has been recently revived as a remedy for dysentery. This treatment was in vogue more than a century ago but fell into disuse. It is claimed that the powder encloses the bacteria and prevents their pathogenic action. Probably this drug has an action in every way similar to that of bismuth in forming a protective coating to the mucous membrane.

TREATMENT OF BACILLARY DYSENTERY

The microscopic examination may show any one of a number of already classified dysentery organisms; for example, the Flexner, Shiga, and other types. Such examination should include fermentation tests and other biologic reactions as well as a study of morphology. The classification, while a matter of great scientific interest, is not however, an important guide for the prognosis or treatment.

The general treatment already outlined is applicable to bacillary dysentery. Certain special measures also may be followed.

Antidysenteric serum may be administered. A reduction in the mortality rate of bacillary dysentery from 30 to 50 per cent. through the use of some serums has been reported by some observers but not confirmed by all. It would seem the best results may be ascribed to an antitoxic action in infection with the Shiga-Kruse type of dysentery bacillus. The most favorable results are observed in the early stage of the disease. Mathieu (*Abst. Jour. A. M. A.*, Nov. 28, 1914, p. 1986) advises the administration of the

serum even before the diagnosis has been made in order to secure its early action. Shiga favors a polyvalent serum as meeting the requirements whatever the variety of organism present.

If the disease progresses and immediate healing of the inflammation does not occur, and actual ulceration seems to have developed, as shown by the amount of bleeding, an occasional irrigation of nitrate of silver, 1 part to 1,000 (not more than one pint at any one time, viz., 0.50 gram ($7\frac{1}{2}$ grains) to a pint of water) is of benefit. Such an injection should be given but once in four or five days, and if the liquid does not immediately flow out of the colon a solution of salt should be immediately injected. The salt forming an insoluble sodium chlorid, will prevent any poisonous absorption of nitrate of silver.

TREATMENT OF AMEBIC DYSENTERY

The diagnosis of amebic dysentery should always be confirmed by a competent study of the morphology of the organism isolated, as well as the injection of the organisms into the rectum of kittens.

The general treatment of amebic dysentery is the same as that of bacillary dysentery.

The specific treatment of amebic dysentery which is comparatively recent is with the aid of ipecac and emetin.

Whether the amebae are on the surface of the mucous membrane, deeply embedded in the ulcers, or localized elsewhere in the body, they may be reached by properly administering ipecac and emetin. The amebae on the surface of the mucous membrane are not likely to be affected by emetin administered hypodermically. On the other hand, emetin given hypodermically becomes more quickly active on the deep seated organisms and the localized lesions. Jones (*Jour. A. M. A.*, March 20, 1915, p. 982) reports fifty cases occurring in the Philippines. The following method of administration is used at the Army hospital in Manila:

Emetin hydrochlorid 0.008 gm. by hypodermic for ten days (twice a day for four days and once a day for six days). Ipecac started about the eighth day

with from 1.5 to 2 gm. doses given at bedtime, continued for three consecutive nights and thereafter decreased by 0.3 gm. each consecutive night. The disagreeable effects of the ipecacuanha were never manifested. It is quite necessary to precede the administration of ipecacuanha by tinctura opii in from 0.6 to 1 gm. doses.

Happy though the results of this combination may be in treating amebiasis, the fact should not be overlooked that emetin is an amebicide and has little to do with the healing of ulcerations. Every case of amebiasis should, after this treatment, be considered one of ulcerative colitis and so treated from a dietetic point of view. At the same time every effort should be made to enhance resistance by change of climate, tonics, etc., to obviate the distressing sequelae characteristic of the disease.

It should be remembered that even after the amebae have been removed, there still remain unhealed ulcers. These should be treated by rest in bed, proper diet and local irrigations. The latter serve not only to promote healing but also act to prevent relapses.

Sulphate of quinin is believed by many to be specific in its destructive action on the ameba, and is much used for irrigating the rectum and colon. It should be used in a 1 to 5,000 to 1 to 1,000 solution. Cures are believed to have been effected by such irrigations in many cases.

If, in spite of the remedies which have been enumerated, the case still continues rebellious, resort to surgical interference may be deemed advisable, and appendicostomy may be performed, and irrigation of the colon by means of the insertion of an irrigation tube through the appendix may be practiced. This was referred to in *Jour. A. M. A.*, Sept. 3, 1910, p. 858.

Great care and patience are required in the treatment of this disease, and the treatment should be long continued, and after the patient is apparently cured, he should be kept under observation for months in order that, if a relapse occurs treatment may be promptly instituted.

Abcess of the liver is a not infrequent complication. Such cases usually recover following emetin treat-

ment if instituted early. It may be necessary, however, to open and drain especially in the event of secondary infection.

Physicians should not temporize with inefficient medical treatment in severe cases of dysentery. There is a possibility of obtaining curative results by prompt surgical measures such as appendicostomy, etc., which may be life-saving.

GASTRIC AND DUODENAL ULCER

Ulcers occurring in the neighborhood of the pylorus, either on the lesser curvature in the pyloric antrum or in the first part of the duodenum, are probably due to similar etiology and have the same general character. They may, therefore, very properly be considered under the same head. Their causation is to be found in abnormal conditions affecting the nerves, the motor activity of the stomach and duodenum, the character of the food and the acidity of the gastric juice. An acute loss of the mucosa in a healthy stomach is rapidly repaired; an acute ulcer of the stomach commonly gets well rapidly. A chronic ulcer behaves differently, indicating that there is some complicating factor to keep it from healing. Considerable experimental work has been done to show that the nervous supply of the stomach is necessary to maintain a healthy condition of the mucous membrane. Further, the experimental work seems to show that a thrombosis of the blood vessels or an "infection" of an area of the mucosa is sufficient to cause the destruction of a portion of the mucosa and institute an ulcer. Ulceration thus produced is favored and the necrotic tissue digested and carried away by a gastric juice of a high degree of acidity. A very marked influence prolonging the existence of such a lesion is the occurrence of pyloric spasm and the retention of the remnants of food and gastric contents containing a large proportion of hydrochloric acid. In such cases the layer of protecting mucus is digested away and the ulcerated mucous membrane is exposed to long continued action of highly acid and irritating gastric contents. Turck has incriminated the colon bacillus; Rosenow has shown that a particular form of streptococci may pro-

duce gastric ulcer; when injected intravenously in animals it almost invariably has this effect.

The process of ulceration in the stomach in the light of our present knowledge may involve the following steps: initial weakness or predisposition of the tissue probably due to insufficient innervation; initial injury in the form of abrasion, thrombosis, or necrosis from infection; removal of necrotic tissue by active gastric juice; recovery in a normal stomach, but in the presence of pyloric spasm or of gastric stasis and the continued action of irritating food or secretions a continuance of chronic ulceration. In addition anemia must be put down as a complicating condition, although not always present.

SYMPTOMS

The symptoms of gastric ulcer are various, but a certain number have been considered classic and should be kept in mind by the physician as the basis of a diagnosis. At the same time the practitioner should bear in mind the fact that any of these signs may be absent or may fail to present their usual characters. The principal symptoms and signs are pain, vomiting, hematemesis, melena, tenderness at epigastrium, tender points near the spine.

Pain in gastric ulcer occurs in attacks with intervals, sometimes of days or longer, and is excited by the digestive process, it does not occur immediately after taking food, but corresponds to the period of high acidity. It is aggravated by coarse foods, but often relieved by the taking of bland foods or of alkalies. The pain is referred to the epigastrium and does not necessarily indicate the exact location of the ulcer.

Vomiting is likely to occur after the taking of food and has little that is characteristic about it when it does not contain blood.

Hematemesis or the vomiting of blood is an important symptom and when the other symptoms are present it may suffice to confirm the diagnosis of gastric ulcer. It must be remembered however that blood may be vomited after it is swallowed from pulmonary hemorrhage, or may be shed into the stomach from the bursting of a branch of one of the radicles of the portal vein or from an esophageal varix. The latter

forms of hemorrhage are sometimes the result of high blood pressure in the portal circulation in hepatic cirrhosis, etc.

The presence of large quantities of blood in the stools may be discovered macroscopically by their dark, tarry character. Such a condition of melena is corroborative of the diagnosis of gastric ulcer, but other symptoms should be present to indicate that the stomach is the source of the bleeding before we should give the mere presence of blood in the stools much weight in the diagnosis of gastric ulcer.

A tender point in the epigastrium is found in most cases of gastric ulcer. It corresponds to the location of the solar plexus and is elicited by slight pressure with the finger differing in this respect from the tenderness due to neurasthenia, which requires considerable pressure to bring it out. The tenderness of ulcer is referred to a point about midway between the ensiform cartilage and the umbilicus, the point being constant in one locality and strictly circumscribed.

Nearly as constant and quite as characteristic are tender points felt sometimes on both sides, sometimes only on the left, in the dorsal region near the spinous processes of the tenth to twelfth vertebra. The disappearance of these tender points during treatment for ulcer is a valuable indication that the patient is improving.

The diagnosis of gastric or duodenal ulcer may be confirmed by the Roentgen ray when observed by repeated pictures or by fluoroscopic observation. Test meals afford only corroborative evidence of the existence of an ulcer. Excess of free hydrochloric acid is usually present. There is frequently evidence of delay in evacuation of the stomach contents, and blood, either macroscopic or occult, is present in the majority of cases. The presence of occult blood in the stomach contents is not pathognomonic. Macroscopic bleeding may be due to injury of the mucosa by the stomach tube.

Occult blood in the feces is of more importance. If not constantly found, it is a strong indication of ulcer presumably in the neighborhood of the pylorus.

ULCER OF THE DUODENUM

The principal symptom is pain, more or less localized in the region of the pylorus, intermittent, occurring generally about two hours after a meal. In other words, this pain occurs when the stomach is more or less empty. This pain is more frequently relieved by eating some bland food or drinking milk than is the pain of ulcer of the stomach. The appetite is generally good, and vomiting and other symptoms of gastric indigestion are infrequent. Attacks of diarrhea may occur, and occult blood is often present in the stools. There may be marked hyperchlorhydria.

TREATMENT

One of the chief factors in the continuance of ulcer seems to be the irritating gastric contents which owe their irritating properties largely to their acidity. Hence the acid secretion should be reduced as a first step by regimen, diet and remedies.

Not only should the degree of acidity be determined and search be made for any other condition of the stomach which might cause chronic irritation but the condition of other organs should be interrogated for other possible cause of hyperacidity and proper treatment should be applied. Medicinally the best remedies are alkalies combined with bismuth; thus one may give

| | | |
|-----------------------------|-------------|--------|
| | gm. or c.c. | |
| R. Magnesii oxidi..... | 15 | or ̄ss |
| Bismuthi subcarbonatis..... | āā | |

M. Sig.: Take a small teaspoonful once in three hours.

If such a powder tends to make the bowels too loose, sodium bicarbonate may be substituted for the magnesium oxid. Atropin or atropin sulphate may be given in doses of from 0.00025 gm. (gr. $\frac{1}{250}$), but the use of atropin should not be continued too long.

As hyperacidity seems to increase the ulceration, certainly increases the pain, and is likely to increase the vomiting, anything that diminishes the acidity is good treatment, and a diet free from the substances that cause the greatest outpouring of hydrochloric acid is the diet of choice. In other words, a diet without fat and without meat broths, without toast, and with-

out any hard particles of food that can scrape or irritate the inflamed part, should be selected. The Lenhartz diet with raw eggs is the most sensible as giving nutrition and at the same time inhibiting the production of hydrochloric acid and tending to heal the ulcer.

The raw eggs are beaten up whole and placed in a cup or glass surrounded by ice. The small amount of milk given is also served iced in the same manner, and the egg and milk feedings alternate with each other every two hours, at first two teaspoonfuls of the egg and four teaspoonfuls of the milk. The first day two eggs are used and six ounces of milk. The eggs and milk are gradually increased from this minimum until by the sixth day seven eggs and twenty-two ounces of milk are given. From the third day on a little granulated sugar is added. At the end of a week the number of eggs is reduced and some scraped beef is allowed, with soon a small amount of boiled rice. During the following week, the second week, the eggs may be soft boiled, and four may be administered a day, with the milk increased to nearly a quart, sugar as before, and scraped beef or chopped chicken and rice or bread with a little butter may be gradually added and the diet thus varied. Even when the eggs are used soft boiled, four should be taken a day. Whatever is taken, if solid, it should be very completely and slowly masticated, and as above stated, at first the amounts ingested at one time must be very small and taken at intervals of two hours during the day. The foods for the first week should be taken cold and the next week only warm, never hot. Small sips of iced water may be taken as often as desired or advisable.

In view of the hyperacidity, it is well to add to the diet as much fat as can well be borne, in the form of butter or cream.

During the first week the patient should be fed, not even allowed to feed himself, and he should remain in bed for at least three and better four weeks.

If there is hemorrhage, an ice-bag should be placed over the stomach and a large dose of bismuth subnitrate should be administered, perhaps 3 or 4 grams (45 or 60 grains) at once.

It generally seems advisable to give bismuth in large doses, at least 2 grams (30 grains) once a day. This can be taken stirred up in water or in milk and quickly drunk.

The treatment above suggested generally stops the pain. If pain is still severe morphin should be resorted to, but with this treatment it rarely will be necessary, and the dose required, hypodermatically, is small.

It must be remembered that the pain results from the presence of free hydrochloric acid and the fact that pain disappears gives no evidence that the ulcer is healed, but the lesion may still continue in a latent state and make its presence felt by symptoms when the increased acidity of a new attack sets up renewed irritation. Sippy's practice is to give alkali enough not only to relieve the pain, but also to neutralize all the free acid and keep it neutral during the greater part of the twenty-four hours. This is accomplished by repeated examinations of the stomach contents. The alkali is repeated whenever the examination shows that free acid is present.

The patient should not get up to urinate or for the bowels; a bed-pan should be used. If the patient is constipated the bowels may be moved by the rectal injection of a half ounce to an ounce of glycerin with an equal amount of water and soap suds could be used if needed.

As these patients are already short on iron and for a number of days are to receive no meat, it is advisable to give the saccharated oxid of iron (eisen-zucker) 3 grains in tablet form twice a day. The patient should thoroughly crush the tablets with the teeth before swallowing.

If after a month of this treatment the patient cannot normally convalesce and be apparently cured, in other words, if the symptoms quickly return, an operation should probably be recommended as the future of such a recurrent case is uncertain. Recurrent severe hemorrhage should cause operation and of course when there is perforation operation is immediately necessary.

Treatment of Hemorrhage.—In case of hemorrhage from the stomach perfect quiet, both mental and

physical, must be insisted on. A hypodermic injection of morphin and atropin in full dose should be administered. If the symptoms show that hemorrhage is persistent 1 c.c. (15 minims) of a 1:1,000 adrenalin chlorid solution in 30 c.c. (1 ounce) of distilled water should be given and followed in half an hour by from 50 to 100 c.c. (about 2 to 3 ounces) of a 10 per cent. solution of sterile gelatin. Ordinarily food should be withheld from 48 to 72 hours, no food being given even by the rectum. As nutrient enemata have been shown to increase the flow of gastric juice, the first enemata should be normal salt solution and later peptonized milk and egg may be used.

During the treatment of gastric ulcer the feces should be frequently examined for occult blood. When blood ceases to be present in the feces we have an indication that the healing of the ulcer is progressing and it is justifiable to use larger quantities of food and that of a more solid character. In case bleeding reappears after it has been absent for some days this should be taken as indicating the propriety of lessening the amount and simplifying the character of the food.

Some physicians believe that morphin should never be given to relieve the pain of hemorrhage because it tends to increase the stasis and hyperchlorhydria that is present in ulcer. Gelatin may be given subcutaneously and in certain cases Lindberg has found it advantageous to rinse out the stomach with a 1 per cent. solution of ferric chlorid. In removing this solution the aspirator should not be used but the liquid should be siphoned out of the stomach if practicable.

OPERATIVE INDICATIONS

When there is marked tenderness at a location aside from the region of tenderness common to the ordinary ulcer or if there should be a slight rise of temperature and an increased leukocytosis one may entertain the suspicion of an approaching perforation. In such case no delay should be permitted before opening the abdomen and ascertaining the true condition.

The following may be given as indications for operative interference in the case of ulcer of the stomach:

1. Recurrent hemorrhage;
2. threatening perforation;

3. failure of the case to improve under medical treatment applied with regularity for a reasonable time, say four weeks.

INTESTINAL STASIS

The term intestinal stasis has of late years been used to include what was formerly classed as constipation but with an extension to more serious cases which require surgical treatment. Intestinal stasis includes all cases in which the contents of the bowel fail to move in a normal manner whether the cause be a mechanical obstruction or a functional failure due to the character of the intestinal contents, or the functional activity of intestinal musculature. The stasis may occur at various locations in the gastro-intestinal canal but the usual location in the cases under consideration are ileal stasis in the lower part of the ileum, colonic stasis in various sections of the large intestine and stasis in the rectum. One of the most frequent kinds of constipation is that occasioned by an obstruction at the anal orifice due usually to an overaction or spasm of the sphincter muscle. Such cases are readily treated by relief of any cause of spasm and the gradual dilatation of the sphincter by bougies. In some cases an operation for the division of the semilunar valves or the valves of Morgagni is necessary. Hindrance to the evacuation of the feces may be due to a paresis of the rectum or sigmoid brought on either by repeated distention with feces or by the use of daily large rectal enemas. In these cases help may be obtained by daily diminution of the bulk of water used. A very frequent cause of constipation is insufficiency of feces resulting from the general insufficiency of the food taken or from the fact that it contains too little of the indigestible vegetable matter which favors the evacuation of the bowels. In such cases the feces are hard, and dry from the fact that during their stay in the large intestine the water has been absorbed to an undue extent. This form of constipation must be treated by proper diet.

DIET

The constipated individual should aim to add to his diet a larger quantity than normal of fluids either in

the form of water or perhaps of buttermilk. Tea and coffee should be avoided because they contain tannin which may, by its astringent action, counteract the good effect of the larger quantity of liquid. Liquids should be given not only at meal times but in the intervals, in which case they serve better to replace the water absorbed from the large intestine. The diet for constipation should also contain as large an amount of fat as the patient can tolerate. The amount of vegetables which contain considerable quantities of cellulose should also be increased. This means plenty of vegetables. Fruits should be given freely, except the astringent fruits. The amount of water taken depends on the patient's habits and the condition of the circulation. A patient who is muscularly active should drink more water than the one whose life is sedentary. A glass of cold water drunk in the morning while dressing is a great help to a physiologic movement of the bowels directly after breakfast. The morning coffee is also a stimulant to peristalsis.

HABIT

The patient should go to stool every morning at the same hour whether the desire is present or not, and should attend to the matter at hand, and, especially should not read for diversion.

Abdominal massage, calisthenics, regulated exercise, walking, rowing, riding, golf playing, or any other muscular exercise that seems advisable should be ordered for the patient of sedentary habits, and it must be urged on him that if the habit of constipation is not now cured the future promises intestinal indigestion, dyspepsia, imperfect action of the liver, imperfect bile, nervous irritations, kidney irritations, and early cardio-vascular-renal disease, i. e., arteriosclerosis, weakening of the heart, and chronic interstitial nephritis.

MASSAGE

Before any severe exercise or any abdominal massage is ordered, or advised, a careful abdominal examination should be made and the physician assured that there is no inflammatory conditions present, as chronic

appendicitis, gall-bladder disturbances, pelvic or other disturbances.

Manual massage may be applied to the abdomen from fifteen to twenty minutes, beginning with light, circular stroking of the abdomen about the umbilicus, first having lubricated well the parts with olive oil. The course of the colon is gradually massaged deeply, all fecal masses broken up and moved down toward the rectum. When massage is deemed inadvisable or inconvenient, faradic electricity may be used. A large electrode may be over the lumbar or sacral spine and the other is moved over the abdomen, stroking from right to left. The current should be interrupted from two to six times a second, and the duration of the treatment and strength of current should vary with the results on the patient.

MEDICINAL TREATMENT

The best medicinal treatment of constipation consists in the administration of the fluidextract of *rhamnus purshiana* (*cascara sagrada*) or some form of aloes or aloin (generally best combined with *bella-donna* and *strychnin*). Sometimes *podophyllin* may be used separately or combined with other laxatives. There are no other laxatives or cathartics so likely to cure constipation as these drugs. Whichever one of these is used, it should be given, week by week, in gradually diminishing doses. Whether they should be given in small doses three times a day, or larger doses once a day depends on the conditions. Generally, the patient not being sick and not willing to be bothered, and with the intent of having a stool after breakfast, and the medicine requiring a certain length of time to act, directly after supper or at bedtime, in one dose, is the best treatment. However, even with the best possible care, when these drugs are given, some patients require a dose daily for months and even years, and can not obtain a stool without it. This is generally not due to the action of the pill on the mind, as the substitution of an inactive tablet will prove.

Perhaps the next best laxative is *phenolphthalein*. This drug seems to be harmless, and seems to act well, and if given in tablet, should be crushed with the

teeth before swallowing, as it apparently acts better when well granulated.

In the simple constipation that is now being discussed it is inadvisable to resort regularly to enemas of any kind or to more brisk cathartics than those above mentioned or to saline cathartics.

Cascara sagrada, as obtained from the drug stores is many times worthless, so far as laxative activity is concerned. On the other hand, some cascara preparations offered to the profession contain other ingredients than cascara, and consequently being more active are supposed by the physician to be more satisfactory, but the patient is really getting a more active drug than the physician desired. The physician should, therefore, be very careful to select and to obtain the best possible pure cascara sagrada preparation for each patient, and after finding the amount of this preparation that the patient needs for laxative effect, should gradually reduce the dose week by week until the patient is cured.

SPASTIC CONSTIPATION

This form, which is usually reckoned as a distinct variety, is characterized by the distress experienced during the act of defecation and by the appearance of the stools which are narrow, sometimes of the caliber of a lead pencil, and often covered with mucus. Sometimes separate masses of mucus in the form of strings or membranes are passed with the stool or at times when no stool is passed. This spastic form usually occurs in neurotic patients and the whole clinical picture is dominated by the nervous element. These cases should receive treatment appropriate to their nervous condition and they are also benefited locally by oil enemata given as a rule on alternate evenings. The technic of administering the oil is very simple. About 250 cubic centimeters of cottonseed oil, as warm as can well be borne, are injected through a funnel attached to a colon tube and allowed to remain in the rectum until the next morning. Patients unaccustomed to these injections should put on a large diaper after the enema to obviate the danger of the oil leaking through the anus. It is necessary to recog-

nize a constipation of psychic origin and one due to habit which must be treated by suggestion and education with appropriate hygienic aids.

What has been said above refers to the treatment of a symptom and only in the mildest cases is it curative in the sense of being addressed to the underlying lesion. Even in cases of spastic constipation which has been interpreted as a pure neurosis it is probable that an anatomic basis is present in the form of a colonic catarrh which is greatly aggravated by the nervous condition. Following Lane a large number of surgeons have explained the symptoms in a large category of abdominal and constitutional disorders as due to a mechanical hindrance to the passage of the intestinal contents and the consequent putrefaction occurring in the bowel.

Ptoses of the various parts of the intestine are believed to form the basis of the obstruction from which the abnormal symptoms arise. In other cases it is supposed that adhesions, inflammatory membranes, etc., cause bends and kinks in the intestine which prevent the free movement of the intestinal contents. Unanimity in the interpretation of these facts has not been reached by clinicians. A number including Einhorn, Bastedo, Wilcox and others consider that the bands and ptoses do not account for the stasis inasmuch as the symptom of stasis is frequently intermittent and persons with equal mechanical hindrances may be free from symptoms indicating the occurrence of putrefaction.

Einhorn refers the doctrine of ptosis to Glénard. The theory of putrefaction and its resultant autointoxication is due to the teaching of Bouchard, Combe and others. This theory is made by Lane and his disciples the foundation for their plan of treatment. The digestive canal is called "a drainage tube" and compared to a sewer system in which any clogging, must cause disaster. It has been asked if our body is resourceful in adequately fighting enemies that it has never before encountered—pneumonia, typhoid fever, etc., how much more must we expect from it in the way of every-day defenses. It is surely well fitted to bar the entrance of harmful digestive products

through the intestinal wall, for this is a continuous happening.

Unless there is a real mechanical obstruction or a definite organic lesion interfering with the intestinal current, a temporary delay of the contents may not be significant. It may even serve to make absorption more complete.

With regard to the autointoxication theory, as far as it concerns intestinal stasis or habitual constipation the latter does not cause autointoxication. As is well known, a patient may have no bowel movement for several days and present no abnormal symptoms. The symptoms frequently associated with chronic constipation may be ascribed to nervous disturbances, and not to autointoxication. Reassurance and nerve sedatives in such cases will often do more good than drastic measures.

In mild cases Lane, following Glénard, recommends an appropriate abdominal supporting bandage. In the severer type Lane recommends operative measures: ileocolostomy or colectomy. With this radical plan of treatment most clinicians and some eminent surgeons do not agree.

SYMPTOMATOLOGY

The symptoms of the milder forms of intestinal stasis are the same as those commonly attributed to constipation. Much of such symptomatology may result from the effect of ptosis on a neurotic constitution and it is probably erroneous to attribute all symptoms observed in such patients to intoxication from the intestines. A proper estimate of the effects of the various factors influencing the clinical course of such cases is important as indicating the relative importance to be assigned to different measures employed. Other symptoms are mechanical from the pressure of the delayed fecal masses, still others may result from dragging on the adhesions or bands connecting different organs; still others due to nervous reflexes from irritation or inflammation of the mucous membrane of the colon. Lastly there are symptoms of actual organic lesions which may result from putrefactive changes in the contents of the colon. Such

symptoms in severe cases may form a serious clinical picture. The following is given by Moynihan as characteristic of such a case:

The patient is generally a woman of unhealthy aspect and attenuated figure. She is lean, cadaverous, flat-chested, and she has a sour breath and cold and clammy hands. The skin is harsh and of an earthy color and bears many crops of pimples; its secretion is apt to be distressingly noticeable. She makes complaint of "indigestion," pain after meals, flatulence, and inveterate and incoercible constipation. The abdominal muscles lack bulk and tone. They are flabby and flaccid, and all the viscera which they should hold up are fallen in greater or less degree. Mentally, there is often a complete absence of the joy of life; the patient is a morose, querulous, and often suspicious and introspective person. These attributes are rarely all present together, but so many of them may coexist as to enable a distinct type of patient to be recognized. In the very obvious cases of this kind, Moynihan does not think the mild measures that can often usefully be employed for the novice—massage, abdominal exercises, and the unrestricted use of paraffin—are really of any value. These sufferers are properly cases for surgical treatment. The colon should be excised in whole or in part. In some, perhaps, ileosigmoidostomy may be done; but in every case, with one exception, in his own series there has been some regurgitation of the intestinal contents upward along the descending colon to the cecum. The stasis then is worse than before, for a mass of fecal material that is never wholly dislodged is palpable at all times.

DIAGNOSIS

It is fortunate that we possess means of making an accurate diagnosis of intestinal stasis by means of Roentgen-ray examinations, either radiographs or fluoroscopic examinations. In this way the length of time that is required for food to pass through the different sections of the intestine can be determined and it may be learned at what point the delay, if any, occurs. Abnormalities in the contour and position of the different parts of the intestine can also be determined in the same way. The existence of intestinal putrefaction is shown with certainty by the appearance of indican in the urine. The extent of the putrefactive changes are not, however, easily estimated in this way. If, on shaking out the urine with chloroform after treating it with Obermeyer's reagent (a solution of ferric chlorid in strong hydrochloric acid, two parts to one thousand) the chloroform has a deep blue color, a considerable amount of indican is present, and it is justifiable to assume that there is a considerable degree of intestinal putrefaction.

TREATMENT

The treatment of mild degrees of intestinal stasis is the treatment of constipation as previously outlined. To this should be added such mechanical supports as are necessary to obviate the effects of ptosis of the intestine. As a laxative agent Lane has strongly recommended paraffin oil. Bastedo and more recent literature generally object to the use of the ordinary drug laxatives and recommend the use of agar-agar or of paraffin oil. The oil to be employed is of the variety known as Russian oil and should correspond to the tests laid down by the Council on Pharmacy and Chemistry.

Surgical Treatment.—The question of what surgical measures shall be resorted to and the proper time to apply them is very important. Medical treatment should be given a thorough trial. If medical measures fail operation may be resorted to. Moynihan believes that nothing short of colectomy offers a substantial chance of cure. The part of the gut that needs removal is, he thinks, the last part of the ileum, the cecum, and the ascending colon. A. Primrose reaches the following conclusions: "Where ill health caused by intestinal stasis resists ordinary medical treatment then surgical intervention of suitable character should be undertaken.

According to A. McPhedran (*Canadian Med. Assoc. Jour.*, Nov. 1914) two classes of cases will require surgical aid: (1) those with organic obstruction which cannot be overcome by the above means, and (2) those who cannot secure the necessary care and supervision, or cannot take the necessary time to effect the needed relief. In most cases, however, the time required probably will not in the end be greater than that necessary for relief by surgical means.

HYPERACIDITY

The changes of opinion that have occurred and the changes in method of treatment in the so-called hyperacidity of the stomach have been reviewed by Adolf Schmidt of Halle, Germany (*Jour. A. M. A.*, Feb. 7, 1915). Practically the term is taken to mean cases of increasing gastric disturbance, appearing at various

intervals after meals, or the ingestion of special kinds of food; heartburn is a common accompaniment. Tests with the stomach-tube reveal either hyperacidity or hypersecretion, and the latter may be separated into a digestive and continuous type. The latter, when appearing periodically, is known as Reichmann's disease or gastrosuccorhea. Pawlow's opinion, that pure gastric juice has the same percentage of hydrochloric acid, must in the light of recent research be abandoned unless we assume that the superficial epithelium produces concentrated alkaline fluid, together with pure gastric juice, which is paradoxical according to Gregerson. Schmidt concludes that the stomach secretion must vary under pathologic conditions. Nervous influences come into play and the question arises whether or not there is an etiologic relationship between the hyperacidity of the stomach and the subjective symptoms. The anamnesis must not be depended on without the use of the stomach-tube. Still more important is the question whether this hyperacidity occurs as a disease dependent only on nervous causes, or whether it always has some organic lesion as a cause. The old notion that it was a pure gastric neurosis has changed on account of the rediscovery of duodenal ulcers. The purely nervous cases are less to the fore, but we would be premature in entirely denying hyperacidity in some cases as a unit *per se*.

C. H. Neilson, St. Louis (*Jour. A. M. A.*, Feb. 7, 1915), considers hyperacidity a symptom of disease rather than a disease itself. It frequently occurs in the sedentary and overworked and in connection with other abdominal disorders, such as appendicitis, gallstones, enteroptosis, uterine displacements, etc. It is also an early sign of the beginning of hyperthyroidism and of tuberculosis, and it may be due to ear troubles or eye-strain. It is a complex affair to deal with, and hence calls for a correct diagnosis of the causal conditions, with the removal of which the hyperacidity often disappears. In addition to these general or exciting causes, the local conditions in the stomach must be considered. Any one who has had hyper-

acidity for any length of time will have certain pathologic changes in the gastric mucosa, hypersecretion and hyperesthesia, and we often find pylorospasm, hypermotility or gastropsis. He divides hyperacidities as follows: "1. Chemical hyperacidity with a normal quantity of gastric content after a Boas-Ewald test breakfast. 2. Chemical acidity combined with hypersecretion or with a continued secretion. Here the quantity of gastric content is abnormally and constantly large. 3. Chemical hyperacidity combined with hypersecretion and hyperesthesia. 4. Clinical or symptom hyperacidity with hyperesthesia. In this class of cases we have all the subjective symptoms of a chemical hyperacidity. In these cases we find a normal total acidity or even a subacidity. The symptoms are due to the hyperesthetic condition of the gastric mucosa, which is painful in a normal or even subnormal acid content. 5. In this class we may find any one or a combination of the foregoing, together with pylorospasm, hypermotility or peristaltic unrest."

TREATMENT OF HYPERACIDITY

In treatment the principal point is, not to confine treatment entirely to the stomach, but also to calm and strengthen the nervous system. Some patients are best treated by being sent at once to a hospital or sanatorium, and Schmidt demands this in every severe case. Naturally, we try first to reduce the secretion. Atropin acts this way, but its continuous use is not advisable, nor is that of the alkalines, which may irritate the stomach glands. Schmidt favors the use of the magnesium oxid, combined with a small amount of belladonna and a purgative, such as sodium sulphate. Silver nitrate owes its excellent effect on hyperacidity to its astringent effect on the circulatory cells and partly to its blunting the hyperirritability of the mucosa. For the latter purpose it should be given half an hour before meals; for the former, a solution to rinse the stomach in the morning by the tube. Diet is perhaps more important, and foods that act as secretory stimulants, like spices, coffee, strong alcoholics, etc., should be avoided. As to special diets, it is dif-

difficult to keep them up for any length of time, and Schmidt has long returned to a mixed diet and strict observance of the following rules: All food must be thoroughly cooked and carefully minced. The stomach must come to rest at least once during the twenty-four hours and the times of the meals changed to secure this. Drinking should be generally diminished and restricted to times when the stomach is not filled with food, especially in cases of ptosis. If the condition is severe or combined with ptosis, he makes the patient stay in bed for two weeks, and this he considers important. Sometimes hot compresses are used to bring relief—twice daily for two hours. At night they are replaced by cold hydropathic compresses. Washing the stomach is indicated only when the hyperacidity is based on catarrh. Temporary relief, however, will always be afforded by the administration of an antacid, and the burning, distress, pyrosis, and flatulence that may be present will all be made immediately better by the administration of 1 gram (15 grains) of bicarbonate of soda. Such treatment is, of course, purely symptomatic. If it is advisable to give bicarbonate of soda, which is perhaps the best of all the antacids, three times a day, before meals, the dose should be smaller, perhaps generally 0.50 gram ($7\frac{1}{2}$ grains). It will act, as above stated, as a gastric sedative and will soothe the irritated mucous membrane, will cause a quicker outpouring of the hydrochloric acid, and will thus hasten the completion of the stomach proteid digestion; all of which will tend to make the disturbance and the dyspepsia better, but, unless there is actual inflammation of the stomach, is not treating the cause. If gastritis is present, no one treatment is perhaps more successful than the combination of bismuth and soda, as:

| | | | |
|------------------------------|-----|----|--------|
| | gm. | | |
| R Bismuthi subnitratiss..... | 20 | or | 3 v |
| Sodii bicarbonatis..... | 10 | | 3 iiss |
| M. et fac chartulas, 20. | | | |

Sig.: A powder three times a day, before meals.

A glass of hot water taken a half-hour before the meal to wash off the mucus from, and to deplete, the

inflamed gastric mucosa is, of course, excellent treatment.

If the antacid is given after a meal the digestion of the starchy foods will go on longer than usual on account of the alkali keeping the contents of the stomach longer alkaline, viz., free hydrochloric acid or a large amount of acid peptones will not so soon be present to inhibit further salivary digestion.

If with the dyspepsia, or gastritis, constipation is present, some magnesium oxid should be added to the above prescription or substituted for the sodium bicarbonate. Also in hyperacidity the precipitated carbonate of lime is used, and is often a most successful treatment.

If an antacid is indicated and diarrhea is present, it is advisable to use lime water.

If an acute hyperacidity is present and there is palpitation or cardiac disturbance, hysterical or other, the aromatic spirits of ammonia is perhaps the best antacid to use.

If for any reason alkalies must be administered for some time, it should be remembered that the sodium salts are better tolerated than the potassium salts, as potassium is depressant to muscles, while sodium is hardly a depressant at all.

As regards operation, the necessity varies according to the case. Schmidt advises an operation in a young man in active business who wishes at all costs to get rid of his pains, rather than in one who is not so pressed and can stand his troubles and regulate his diet. The manner and extent of the operation must be determined by the findings, such as ulcer, gall-stones, adhesions, etc. If there are no anatomic lesions at all found, he would advise gastro-enterostomy without closing the pylorus and the dietetic and other treatment continued. In no case should the patient be permitted to get up and eat anything he wants too soon after an operation.

TAPEWORM

Treatment to eradicate a tapeworm is based on several factors which, though simple, are fundamental. The treatment should be grounded on a knowledge of the worm, its pathology and method of existence.

The diagnosis of the presence of any of the tape-worms in the bowel must be finally settled by the finding of the organism in the stools. However, other phenomena such as indefinite pains, a sense of distention, ravenous hunger, etc., are not unusual.

Before administering the anthelmintic several days should be devoted to the preparation of the bowel. The patient should take only a light liquid diet and should gradually cleanse the bowel by the use of the following prescription:

| | gm. or c.c. | |
|---------------------------|-------------|-------------|
| R Magnesii sulphatis..... | 60 | ℥ ii |
| Spiritus chloroformi..... | 12 | or fl ℥ iii |
| Aquae | ad 180 | fl ℥ vi |

M. et Sig.: A tablespoonful, in water, three times a day, an hour before meals.

An enema of soap and water may be given at night. This treatment removes solid fecal mater from the bowel as well as any adherent mucus coating which may be present. The night before the final treatment is to be administered the patient is given a final cleansing dose, perhaps two tablespoonfuls of the above mixture, and then takes no food and but little liquids. The next morning after the bowels have moved male fern may be given as follows:

| | gm. | |
|----------------------------|-----|--------|
| R Oleoresinae aspidii..... | 4 | or 3 i |
| Fac capsulas, 8. | | |

Sig.: Four capsules, with half a glass of hot water at 9 a. m., and four capsules, with hot water, at 10 a. m. [Important: Before taking the above capsules each one should be uncapped.]

At 12 o'clock three tablespoonfuls of the magnesium sulphate mixture should be taken to insure the rapid passage of the male fern through the intestine lest too much absorption take place.

During the morning no nutrition should be taken other than black coffee, clear tea, or bouillon.

Except when momentarily otherwise engaged, the patient should be in bed, and should stay in bed the remainder of the day. For unavoidable faintness brandy may be administered at any time, or a hypodermatic injection of strychnin may be given. After 1

o'clock any food may be given the patient that he desires.

During the three or four hours of this active treatment, viz., from 10 a. m. to 1 or 2 p. m., the physician should remain with the patient, or a thoroughly trained nurse should be in attendance.

The stools should all be passed into receptacles where they can be thoroughly strained afterward in order that the parasite's head may be sought, and if the above treatment is carried out it will generally be found.

Pomegranate has been highly lauded by various physicians as an efficient anthelmintic in these cases. It is best given, after thoroughly cleansing the patient's bowel as has been described, in the form of a fresh infusion. Three ounces of the fresh bark are macerated in twelve ounces of water for a half day and the infusion then boiled down one-half. This quantity is taken within an hour in several doses and followed within an hour or two by castor oil.

Pomegranate may cause dizziness and extreme nausea where given in this form. As alternative an alkaloid derived from the bark—pelleterin tannate—is sometimes used. The dose is from 3 to 6 grains, and should be given fasting, mixed with a little water. A glass of water should be taken a little after its administration and an hour afterward a cathartic.

Other vermifuges include turpentine, kousso, pumpkin seed and thymol.

ASCARIS LUMBRICOIDES: ROUND WORM

The round worm is a common parasite, often very difficult to diagnose. The symptoms are indefinite and include vague colicky pains, foul breath, itching at the nose, etc. The common source of infection is water or food. The finding of the worm in the feces is the final proof of its existence. It is of reddish brown color, about $\frac{1}{4}$ -inch in diameter. The male varies in length from 4 to 8 inches, the female from 6 to 12 inches. Though the intestinal tract is the normal habitat the worms wander, and they have been found in the larynx, nose, Eustachian tube, tonsil and other contiguous structures.

TREATMENT

The diagnosis having been confirmed treatment should be begun by administering laxatives at night to cleanse the bowel. Santonin is a favorite vermifuge in these cases, but many cases of poisoning have followed its use and it should be given with caution. The dose is 2 to 5 grains. The drug may be administered in the following form:

| | gm. or c.c. | |
|--------------------------------|-------------|------------|
| R Santonini | 0\|30 | gr. v |
| Hydrargyri chloridi mitis..... | 0\|20 | or gr. iii |
| Sacchari lactis..... | 3\| | gr. xlv |
| M. et fac chartulas 10. | | |

Sig.: A powder, in water, every hour for three doses.

Considerable discussion has occurred as to whether Santonin may not be administered in castor oil to advantage and there is much good clinical authority for its use in doses of two or three drops in a dram of castor oil.

Thymol has been used with good results in these cases and wormseed oil (*oleum chenopodii*), an American product, has given good results. The dosage of the latter may be five drops on a lump of sugar and this may be repeated and followed by a cathartic.

OXYURIS VERMICULARIS: PIN WORMS

This worm varies in length from 1/5-inch for the male to 2/5-inch for the female. The former has a blunt tail, curved upward, the female a pointed drawn out tail. The most common symptom is itching about the anus, caused by boring movements of the female in depositing eggs in the rectum. The worm's chief habitat is the bowel from the jejunum to the anus. It is believed that the source of infection is the swallowing of ripe eggs in drinking water or food.

The treatment consists in removing the worms by frequent washing of the region infected. Internally salts, such as magnesium or sodium sulphate, may be given, or large doses of calomel.

To dislodge the worms from the rectum enemata should be given. Among various enemata which have been recommended are decoctions of quassia—an

ounce of quassia chips in a pint and a half of water boiled down to a pint and strained; lime water; salt water; glycerin and water; turpentine—1 dram to a pint of soap and water, etc.

For local itching and abrasion such ointments as the official unguentum phenolis (3 per cent.) or some mild sulphur ointment may be employed.

DISEASES OF THE KIDNEY

PYELITIS

The causes of infection in the kidney, as elsewhere in the body, may be stated as a lowered resistance of the tissue and an organism capable of infecting the kidney tissue, coming usually from a focus elsewhere in the body. Barber and Draper have shown that ascending infection by the ureters seldom if ever occurs as long as the peristalsis of the ureters is unimpaired and the uterovesical valves maintain their integrity. Most infections are therefore hematogenous. Among the factors lowering the resistance of the kidney tissue, nephrolithiasis or kidney stone, is perhaps the most common cause, others being traumatism, urinary obstruction, displacement, etc. The pyelitis of pregnancy arises from pressure of the gravid uterus which may mechanically obstruct the ureters. Not infrequently the pyelitis is a complication of such acute infectious fevers as typhoid and pneumonia. Among the various focal infections which may bear an etiologic relationship to pyelitis are tonsillitis, alveolar abscesses, and infections of the accessory nasal sinuses.

According to MacGowan (*Jour. A. M. A.*, Jan. 16, 1915) the organisms producing pyelitis are, in the order of their frequency, colon and tubercle bacilli, staphylococci, streptococci, gonococci, typhoid bacilli, paratyphoid bacilli and pneumococci. These infections are simple metastases. They occur rapidly, are usually acute and persistent, may cause multiple abscesses and also may destroy the kidney and often the life of the patient. In their early diagnosis the chief means is exclusion, as the symptoms are essentially abdominal and may simulate other troubles like appendicitis, liver disorder, etc. The most prominent symptom in kidney suppuration besides

fever is marked tenderness at the costovertebral angle, which is always present. The urine does not indicate the micro-organism and in advanced or serious cases it will contain leukocytes and there will be a leukocytosis, usually not over 25,000. A severe chill usually means a high grade of infection. Staphylococcus and streptococcus nephritic attacks are most frequent and have been observed following boils, tonsillitis, acute osteomyelitis, felon, ulcerations about the rectum and contagious impetigo.

TREATMENT

In arranging the treatment for pyelitis the cause must be sought, that is, the focus, the nephrolithiasis, or cystitis. According to MacGowan these infections divide themselves into two classes as regards treatment: First, those that are cured with an abundant use of water, vaccines, diet, rest, hexamethylenamin, potassium nitrate and mild diuretics; second, those that require incision and decapsulation, opening of abscesses and drainage. In the first type the patient should be kept absolutely at rest in bed on a soft meat-free diet. The liquid intake should be sufficient to cause the patient to pass from two to three liters of urine daily and thus flush the kidneys out thoroughly. The medicinal treatment of pyelitis depends on whether the urine is acid or alkaline. If the patient is troubled by frequency of and distress on urination it is best to render the urine alkaline as it is then less irritating. The alkalinization of the urine is furthermore an excellent method of treating the pyelitis for the bacteria causing the pyelitis do not thrive in an alkaline medium. The alkalinization of the urine may be accomplished by the use of alkaline drinking waters, of fruit juices of acetates, citrates or carbonates. The carbonates are the most effective, but are not always well tolerated by the stomach, in which case some of the other salts may be tried. It is best to use this method of treatment until the bladder irritability has disappeared and then to allow the urine to become acid and to prescribe hexamethylenamin for a few days until the bladder becomes

irritable again, when the alkaline treatment is resumed. Other drugs such as salol, methylene blue and the oils of turpentine, sandalwood, juniper and copaiba have also been used in the treatment of this condition.

Colon bacillus infection is the most frequent type, is persistent and requires the removal of the original focus. The attacks occur at uncertain intervals and frequently cause great pain. The urine is practically always acid and distinguished from that containing other infecting organisms, except the *Proteus Hauser* by its remaining turbid on standing. From the proteus it is distinguished by the putrid fecal odor and its acid reaction and the triple phosphate crystals observed with the latter. The first symptoms are often those of a light cystitis. Constipation is an etiologic factor and any slight injury to the mucous membrane of the bowel gives an entry to the infection in the blood whence it may reach the kidney through any injury there. Some cases are amenable to purely medical treatment, diet, etc., and MacGowan speaks highly of the relief afforded by ureteral catheterization and pelvic lavage with weak solutions of silver nitrate, aluminum acetate and mercuric oxycyanid from 1:10,000 to 1:5,000. Argyrol, collargol and other silver preparations have also been mentioned for this purpose. It should be remembered, however, that ureteral catheterization requires expert service. In children in whom the disorder is common the majority of cases will yield to alkaline treatment and sweat baths. Vaccines are useful in colon bacillus infections, especially autogenous vaccines, but they must be used with great caution, as violent reactions may be produced. Pyelitis gravidarum is considered with colon bacillus infection as this is the cause in 70 per cent. It is a serious infection, and whenever, in a gravid woman, some unknown fever appears and there is very slight pain at the costovertebrae angle at one side, it is well to search in the urine for the colon bacillus. With attention to the prodromes, ureteral catheterization and lavage will often abort an attack. Rest in bed and diuresis are essential. If the child has right lateral position, have the woman lie on the left

side and vice versa. The prognosis is usually good for the mother as to saving her life but not for a permanent cure, and it is always bad for the child. MacGowan always advises the induction of premature labor unless contraindicated.

Renal tuberculosis is a progressive infection, slow in its development, often remittent and probably incurable by medical means. It may appear in the miliary form as a part of a general tuberculosis. There also exists a chronic parenchymatous nephritis occurring in the later stages of lung tuberculosis. According to some writers there is an interstitial tuberculous nephritis. Fourth, and most important, is the type of minute focal infections tending to coalesce almost invariably unilateral at first and occurring in persons not affected with active tuberculosis. This is the form usually meant by the term renal tuberculosis. There are no diagnostic symptoms for the early stages. The first is vesical irritability, followed later by albuminuria and perhaps hematuria. It is apt to be confused by the practitioner with renal stone, though that is a much rarer condition. Pus in the urine is not long delayed and with it Koch's bacillus appears. The blood stream is the mode of invasion except in very rare cases. One kidney is first affected in most cases but the other kidney later becomes involved. When operation is refused the other kidney usually becomes affected in three years and the patient dies within five. After the bacillus is discovered the diagnosis is clear but the cystoscopic appearances will confirm it. There are two ways of treating the patient, either the general treatment for tuberculosis or nephrectomy, which gives immediate relief in 75 per cent. of cases, and permanent cures in 50 per cent. MacGowan does not put full confidence in tuberculin treatment in these cases; if used the dose should be very small at first.

In malignant or explosive types of pyelitis, with great depression and marked toxemia, nephrectomy is the only remedy, if the case is unilateral. Any obstruction to urine must be removed and if a stone is present, it must also be removed.

ACUTE NEPHRITIS

Acute nephritis arises as a result of injury to renal parenchyma due to bacterial infection or chemical toxins. To the first of these belong the acute nephritis of scarlet fever and the other acute infections, though there may be a toxic element in addition. The classical example of the infectious type of acute nephritis is that which follows an acute tonsillitis or sinusitis. As examples of the toxic type, we have the cases following extensive burns and poisoning with such substances as turpentine, cantharides, phenol, the salicylates, potassium chlorate, iodoform, mineral acids, arsenic, phosphorus, mercury and lead. The acute nephritis of pregnancy is also in all probability of toxic origin. Alcoholism is of itself probably not a cause of nephritis, but the exposure that so often accompanies excessive use of alcoholics may give rise to an acute infection which is the cause of the nephritis. Dick has shown that bacteria are present and responsible in nearly all types.

As to prognosis, the acute nephritis may clear up entirely, it may become chronic, or it may end fatally due to uremia, anasarca, or to a pneumonia or other terminal infection. A condition which sometimes follows an acute nephritis should be mentioned; in some cases there results a permanent albuminuria which is not, however, accompanied by symptoms of renal disease. In fact, in these cases there is no impairment of renal function as shown by such functional tests as the phenolsulphonephthalein test. The cause of this albuminuria is probably a permanent cicatrization in a portion of one or both kidneys which is, however, not sufficient to impair the renal function.

There are two rather diametrically opposed methods of treating acute nephritis, one based wholly on clinical experience and the other principally on the experimental work of Martin H. Fischer.

Fischer in his experimental work has shown that acidosis will cause edema and albuminuria and that this edema and albuminuria can be overcome by overcoming the acidosis with alkalies. He argues that in nephritis we have conditions similar to those that he

has experimentally produced by acidosis and overcome by the use of alkalies. Further, he has shown that by using sodium chlorid, a smaller amount of alkali is needed to overcome the acidosis and the resulting edema. He has outlined a treatment for nephritis based on this experimental work which in many cases seems to produce better results than any other treatment. He recommends that this hypertonic solution (sodium chlorid 14 grams, sodium carbonate 10 grams and water 1,000 c.c.) be given per rectum: this is best given by the drop method and, unless the patient is becoming uremic, 500 c.c. at a time twice a day. If the patient is showing symptoms of impending uremia 1,000 c.c. may be given per rectum or even intravenously. In giving the solution intravenously care must be taken that none of the solution enters the tissues as the hypertonic solution may cause a slough. The best method of giving it intravenously is through a needle into one of the veins of the forearm, such as the median basilic vein; the solution should enter slowly so that it may be well mixed with blood. Fischer's directions should be followed in preparing the solution for intravenous use. In addition to the above intravenous or rectal medication, he recommends giving alkalies and sodium chlorid by mouth. The alkalies may be given in water or in fruit juices. The liquid intake is not limited, but all liquids should be isotonic or hypertonic so as not to overcome the effect of the solution given per rectum. The diet is composed of soft foods which are heavily salted. The patient should be kept at rest in bed until well on the road to recovery and then allowed up a little more each day. The bowels should be kept moving freely by the use of mercurials and salines, and if the enemas are not retained opium suppositories may be used to make the rectum more tolerant. The total liquid intake and output must be accurately measured to make sure the edema is lessened.

The other method of treatment, which is based on clinical experience, is diametrically opposed to the above. In this the amount of liquid intake is limited to 1 to 1.5 liters, and the amount of sodium chlorid reduced to a minimum, even salt free bread being

used. Otherwise the diet is about the same, though in severe cases it is limited to milk. The bowels are kept moving freely and elimination is promoted by the use of hot air sweats and rarely by the use of diuretics. When uremia seems to be impending, cases being treated in this manner are given sweats and at times subjected to venesection, as much as 500 c.c. of blood being withdrawn in certain cases. Rest in bed is of course necessary under this treatment. Accurate measurements of the total liquid intake and output should be made in all cases of nephritis, as this gives the best indication of the results that are being obtained.

While the Fischer treatment does not seem to work in every case, it produces such rapid results when it is beneficial that it should perhaps be tried first. Of course the sweats may be used in conjunction with this method of treatment as may venesection. If the alkali treatment does not work, the other older method may be attempted. General supportive treatment may be added as indications arise whichever method is used.

Of course whenever possible and as soon as possible the cause of the nephritis must be removed. In cases following tonsillitis, tonsillectomy should be performed as soon as the patient is well enough. Removing the cause at an early stage makes the reoccurrence of an acute nephritis and the transition to a chronic form less likely.

Treatment of acute nephritis by nephrotomy or by renal decapsulation has been practiced by some, especially in those cases in which there is an abundance of lumbar pain and not very severe urinary symptoms. These operations have in some cases caused relief of symptoms, but should be tried as a last resort. The resulting scar tissue as it contracts may of itself aggravate conditions, especially if a chronic interstitial nephritis should ensue.

As many cases of acute nephritis are due to bacterial infections the question of the use of vaccines arises. Vaccines as yet have not proved to be of any assistance in the treatment of nephritis in the acute, bacute or chronic stages.

ACUTE NEPHRITIS IN CHILDREN

Renault and Siguret (*Annals de Méd. et Chir. Infant.*, 1914, April 1, xviii, p. 240), in a study of acute nephritis in children, think that bed rest and an exclusive milk diet are all that is needed in mild cases. When symptoms develop showing that the kidneys are becoming less permeable to salt and urea, diuresis should be promoted and the congestion in the kidney reduced by dry cupping, repeatedly applied in Petit's triangle. In the severe cases and with older children venesection is sometimes preferable, or wet cupping in the lumbar region or leeches to each kidney. Moist heat to the chest is often effectual in relieving congestion of the kidneys; it is left in place for fifteen or twenty minutes, repeated every three or four hours. They advise against revulsion by mustard pastes, etc., but have often found useful in the threatening cases a full bath at 38 C. for fifteen minutes when there were no contraindications on the part of the heart. A wet cloth should be kept on the head during the bath.

Drugs to act on the kidneys are too much of a strain for them; diuresis is best promoted by reducing intake of salt and of water. If this is not enough, a cold enema might be given every hour, and decoctions of cherry stalks, or grape juice in small quantities, are often useful adjuvants. Calcium chlorid may help; 0.2 gm. a day for each year of age, but if it does not benefit promptly it should be dropped after a few days. Nothing but sugars can be given to promote elimination of nitrogen, they say, suggesting 10 to 50 gm. of lactose in the beverages during the day. Also subcutaneous or intravenous injection of 200 or 250 c.c. of a 45 per-thousand solution of glucose. The bowels and the skin should be stimulated, but they say that calomel and pilocarpin are directly contraindicated.

Nothing but water, and little of that, should be allowed the first two days, then unsalted gruels, gradually adding a little milk, finally giving nothing but milk, and no more than 1.5 liter in the twenty-four hours, and always warm, sweetened or not as desired, fractioned every three hours from 8 a. m. to 8 p. m.

The mouth should be rinsed out afterward with an alkaline fluid each time. After a time other food can be added, but always without salt and with minimal nitrogen. If there is no sign of edema by the end of a month, a little salt can be allowed. Other important elements in treatment are repose in bed, constant warmth and scrupulous disinfection of the throat and nose every day. In case of convulsions lumbar puncture may prove useful.

CHRONIC NEPHRITIS

Chronic nephritis, Bright's disease, or as it is sometimes called, cardio-vascular-renal disease, is apparently increasing in frequency in this country. Its treatment, both active and prophylactic, is naturally important. Patients suffering from this disease usually first consult a physician complaining of the symptoms that are usually associated with high blood pressure. The physician should then analyze the case to find out the fundamental cause of the trouble. In some of the cases there is a history of a previous acute nephritis, of acute inflammatory rheumatism, there may be an old heart lesion or some other point in the history that makes the solving of the problem relatively simple. In the majority of the cases, however, this is not the case and a physical examination reveals nothing but a slightly enlarged heart with perhaps a little dilatation of the arch of the aorta and a slight edema of the feet. Urinalysis may reveal nothing, but on repeated examinations the urine will be found to be of low specific gravity and occasionally to contain casts and a trace of albumin. The blood pressure will be found to range from 170 to 200. In these cases a careful search for a chronic focus of infection must be made. This is usually found in the tonsils, teeth, sinuses, or gallbladder. This focus of infection must be removed as the toxemia resulting from it is probably the cause of the high blood pressure. If the hyperarterial tension has not been of too long standing the removal of the focus will cause an almost immediate reduction in blood pressure and a complete cessation of symptoms.

In the cases in which there is an old organic heart trouble this must be treated primarily, and as the heart condition improves so does the kidney trouble. The best treatment for these cases is rest in bed on restricted liquids and a soft meat-free salt-free diet. In the more severe cases the Karell management is most efficacious. The Karell treatment consists of rest in bed and a light diet of milk and eggs. The fluid is limited to $1\frac{1}{2}$ pints per day. At first this is given, for two or three days, as milk only, 6 to 7 ounces at 8 a. m., and 4 to 8 p. m. This is the most trying part of the method. Then 1 egg is given at 10 a. m. and a biscuit at 6 p. m. for a couple of days. Then 2 eggs with bread, and a little minced meat are allowed. In twelve days the patient returns to a careful ordinary diet, the fluid being still kept down to $1\frac{1}{2}$ pints, but not necessarily milk only. This method is said to be indicated for weak hearts for which digitalis is less appropriate. About the third day diuresis sets in for a short time, the dyspnea is relieved, the pulse improves, and the edema subsides. Elimination through the gastro-intestinal tract should be promoted by the use of calomel (3-5 gr. at night) and salines in the morning. If the patient is showing signs of intoxication, and is strong enough, hot air sweats may be beneficial. Venesection may also be indicated in such cases and by relieving the heart and removing toxins often causes marked improvement. The same management is applicable to the cases in which the kidney is the most affected organ.

The most important item in the treatment of chronic nephritis, according to Elliott (*Jour. A. M. A.*, Nov. 21, 1914, p. 1878), is the preservation of cardiac compensation. The high blood-pressure and cardiac hypertrophy of chronic nephritis constitute a compensatory mechanism enabling the kidneys to maintain adequate function. They consequently are essential to the preservation of life and should be protected by every hygienic and dietetic safeguard. High blood-pressure should not be made the object of direct therapeutic attack. Nitrites should be reserved for emergency use to combat such developments as angina,

cardiac asthma, etc. The appearance of dropsy in primary chronic nephritis almost invariably signifies the advent of cardiac failure. At this stage the digitalis bodies become the mainstay of treatment and should not be withheld because the blood-pressure is high, as they act just as well or even better with a high blood-pressure as with a falling pressure.

In the cases that are primarily cardiac the use of caffeine, digitalis, strophanthus and the other cardiac tonics is of great value. The use of theobromin and other drugs, the action of which is essentially diuretic, should be guarded as in many cases of chronic renal disease they do not increase the output of urine and act rather as a poison on the system.

In certain cases of chronic nephritis in which there is considerable edema without dilatation of the heart the Fischer treatment, as described under acute nephritis, produces excellent results, but on the whole it does not seem to be as efficacious in the chronic as in the acute nephritides.

Another form of chronic nephritis that must be considered is that caused by general arteriosclerosis. In this form there are two causes for the trouble, namely, the injury to the kidney parenchyma from the altered blood supply to the kidneys and the toxemia arising from the altered metabolism throughout the body which is due to impairment of the circulation from the arteriosclerosis. In this form the treatment must necessarily be purely palliative, as the cause can not be removed. These cases are usually, weak, anemic and poorly nourished and consequently the sweats and venesection can not be used. The Karel management is the best to use in severe cases of this type, but ordinarily restriction of liquids to one quart or so, a meat-free diet and free catharsis suffices to keep these cases comfortable. In these cases diuretics and cardiac stimulants must be used with great care and in many of them are contraindicated.

In those cases of nephritis in which there is amyloidosis the treatment should be primarily of the causative condition as the kidney condition is secondary to it.

As to the treatment of the cases of long standing cardio-vascular-renal disease that are to all appearances in excellent health, but have a constant high blood-pressure and much of the time have albumin or casts in the urine. Most of these cases may be kept very comfortable and the blood-pressure kept reasonably low if they will diet carefully and exercise only moderately. Such individuals should avoid meats, especially the red meats. Coffee, tea, alcohol, rich spiced foods and tobacco should not be used at all. The diet then should consist of fruits, cereals, vegetables, eggs, milk, cream, butter, and in most cases such meats as chicken, turkey, lamb and fish may be allowed once a day. Shell fish may be used in moderation.

These patients may exercise moderately, and indeed it is best for them to get a definite amount of out-of-door exercise. Walking is the best form and golf in moderation may be allotted to some. Whatever form of exercise is taken, it should be begun gradually and increased slowly. While this is being done the patient should be frequently examined by the physician to make sure that he is not overdoing.

As to the massage and bath treatment of nephritis, when regulated by a physician who is in close touch with the patient's general condition, such treatment as is given at many places abroad and in this country is excellent. However, unless controlled by a physician, such treatment may do a great deal of harm. Massage is only a form of exercise and if overdone may do as much harm as too much exercise of any other sort. Baths are quite enervating and fatiguing even to a healthy individual who is not accustomed to them, and so to the nephritic with his lowered vitality may be a source of great danger.

As to the mineral waters of various sorts which are extensively advertised for use in nephritis, these derive what value they possess from their mild cathartic and diuretic action. In those cases in which the excretion of water is abundant, the use of these waters may be of assistance as they promote elimination. They have no specific action as is claimed for many

of them and should not be used in those cases in which the excretion of water is diminished. When limitation of liquid intake is necessary the liquids taken should be restricted to milk, cream soups, fruit juices, etc., which are nourishing and as efficacious as diuretics and laxatives as the mineral waters, are more pleasant to take and more quenching to the thirst.

When it is possible, patients suffering from chronic nephritis may spend as much time as possible in warm climates, as warm weather promotes elimination through the skin. Furthermore, by causing a superficial vasoconstriction cold tends to increase the tension in the deeper vessels and so increase the possibility of cerebral hemorrhage or hemorrhage from other vessels. Angina pectoris, which may be a complicating factor in many of these cases of hyperarterial tension, is often subsequent in appearance to sudden exposure to cold.

UREMIA

In uremic patients there is a severe toxemia due to renal insufficiency. When the patient is quiet, the relief of the toxemia is the chief requirement except such general supportive measures as may prove necessary. This toxemia has usually been treated by the promotion of elimination through the skin by sweats, through the intestines by free catharsis and also by venesection. The diuretics are generally of little use in treating these conditions. Fischer's solution administered intravenously or per rectum has proved to be one of the best, if not the best, methods of promoting elimination through the kidneys in these cases. The general symptoms are also greatly relieved, even when sweating and venesection are not used. Some of the most striking results obtained by the use of Fischer's solution have been in cases in which there was insufficient excretion of urine and a consequent uremic condition with no clinically demonstrable anasarca.

In those cases of uremia in which the patient is extremely restless, and also in those in which there are convulsions, the above eliminative treatment must be used, and in addition the patient must be quieted.

In the first place the usual methods of restraining a patient in bed must be practiced. Windows should be protected to prevent accidents; all instruments with which injury might be done to attendants or to the patient should be kept out of reach. Bromids may be given in enemas in doses of twenty to thirty grains in place of the salt of the Fischer's solution. If the patient will take them they may be given by mouth. Chloral may also be administered either by mouth or per rectum. In the more severe cases it is necessary to use opiates and sometimes even chloroform to quiet the convulsions. Many of the cases of uremia, however, proceed to a fatal termination in spite of all that may be done. At necropsy a complicating bronchopneumonia or hypostatic pneumonia is often found which undoubtedly has much to do with the fatal termination of the disease in these individuals.

CYSTINURIA

Cystinuria may be classed among the rarities of medical practice. However, the perversion of metabolism whereby cystin, one of the amino-acid fragments of the protein molecule, is not destroyed in the body as it is in a normal person, is not so uncommon as statistics might lead one to believe. As the metabolic disorder may exist for very long periods without revealing itself by any easily detected symptom other than the presence of the unutilized cystin in the urine, the discovery of the cases becomes more or less fortuitous. Only when urinary concretions arise to direct attention to their cause, or when the presence of cystin is detected by chance in a routine examination of the urine, does the anomaly come to the knowledge of those who are interested in its cause and treatment.

From the point of view of the patient the chief problem in connection with cystinuria is either to decrease the output of cystin or to increase its solubility in the urine—or both—with the aim of avoiding the impending danger of calculi. The pronounced insolubility of cystin in urine of the usual reaction makes the possibility of attacks of "kidney colic" and related consequences an ever-present one. It has long been known

that the output of cystin can be decreased by a diminution of the metabolism of its mother-substance, protein. In the entire absence of any intake of albuminous foods, the urinary excretion of cystin is reduced to an endogenous level, represented in an illustrative case in the literature by 78 mg. a day.

Klemperer and Jacoby (*Therap. der Gegenw.*, 1914, lv., p. 101) studied the results of alkali administration in such a case. They found that the deposited cystin sediment promptly decreased in amount and soon completely disappeared from the urine following the daily ingestion of from 6 to 10 gm. of sodium bicarbonate. From the point of view of preventing the precipitation of cystin and consequent formation of calculi, this treatment was evidently successful. Incidentally, it further developed that even dissolved cystin entirely disappeared from the urine as the result of the alkali therapy.

DISEASES OF METABOLISM

DIABETES MELLITUS

According to Osborne, while a frequently occurring glycosuria may be a danger signal as a forerunner of the real disease of diabetes mellitus, still, if the sugar can be made to disappear from the urine by a change in the diet, that disease is not present, but the presence of sugar in the urine shows that there is an insufficiency of the organs taking part in the glycogenic function, viz., the pancreas, suprarenals or liver. An insufficiency or an improperly correlated activity of any one of these three organs may cause sugar to appear in the urine. A temporary glycosuria may be caused by "phosphoric, lactic and hydrochloric acids, phosphorus, arsenic, and by carbonic oxid poisoning." Glycosuria may also occur as a complicating disturbance in Graves' disease, exophthalmic goiter, and during the administration of thyroid extract, showing that too much thyroid stuff in the circulation can cause glycosuria. Various disturbances in the brain can cause, reflexly, glycosuria which will disappear if the disturbance is removed.

In certain cases glycosuria is due to the fact that the kidneys are unable to retain the sugar present in the blood. This is termed renal diabetes.

The diagnosis of diabetes is based on the finding of sugar in the urine. Of recent years, an examination of the blood as to the amount of sugar present in it is also being made thus ruling out renal glycosuria. In diabetes the sugar persists and increases under inadequate treatment. Even under the best regulated treatment, however, a trace of sugar may remain or reappear at intervals, in the urine.

THE DIET IN DIABETES

In regulating the diet it is important not only to exclude sugar and sugar forming material but to reduce the total quantity of food so as not to tax

unduly the metabolism of the patient. According to Allen, who has made a scientific and elaborate study of the subject, the first step is to fast till glycosuria ceases, and then for twenty-four to forty-eight hours longer.

When the fasting patient has been free from glycosuria for twenty-four to forty-eight hours, the next step is to begin feeding very slowly and cautiously. There need not be a fixed program. It is desirable to individualize the diet to suit the needs of different patients. The one requirement is that the patient must remain free from both glycosuria and acidosis. Any trace of sugar is the signal for a fast day, with or without alcohol. The original fast, to clear up the urine in the first place, may be anything from two to ten days, but after that no fast need be longer than one day. The things to be considered in the diet are carbohydrate, protein, fat and bulk. Frequently the first thing given after the fast is carbohydrate. No distinction is necessary between different forms of starch, but there are advantages in using vegetables. The first day after fasting, the only food may be 200 gm. of vegetables of the 5 and 6 per cent. classes. This is increased day by day until a trace of glycosuria appears, which is checked by a fast day. The purpose of such a program is to learn the carbohydrate tolerance and to clear up the last traces of acidosis. Falta (*Abstr. Jour. A. M. A.*, Feb. 14, 1914, p. 580) explains the reasons for his practical conclusions that the diet of diabetics should be predominantly boiled cereals. When baked, the grains are broken up in a different way and absorption proceeds under conditions that do harm. In gruels, porridges and soups, however, all the cereals are available and also rice, tapioca, potato, corn and millet, alone or in combination. He thinks that the greater consumption of meat is possibly responsible to a certain extent for the increasing frequency of diabetes. When there is a predisposition to diabetes, the abuse of meat should be warned against; it is possible that a strict vegetarian diet, with cereals boiled instead of baked, might help to ward off the disease better than the restrictions hitherto in vogue. Knerr's (*Abstr. Jour. A. M. A.*, March 13, 1915, p. 942) pro-

cedure is to put the patient to bed and allow him nothing whatever except a dram of raw cornstarch stirred in a glass of warm water every two hours. The result is most gratifying. Both sugar and acidosis decrease gradually. The raw starch serves two purposes: It supplies considerable nourishment and it prevents acidosis, so there is no danger of coma and no need of alkaline dosage, and the patient suffers none of the distress of the rigid starvation regime. All wines and some whiskies and brandies contain some sugar, so Knerr prefers pure alcohol if any is to be given at all. Its only advantage is to modify the taste of the raw beaten egg.

After the carbohydrate period, according to Allen, or sometimes in place of it, protein is given. On the first day perhaps one or two eggs are given, and nothing else. More protein, generally as eggs and meat, is added day by day, until the patient either shows glycosuria or reaches a safe protein ration. The purpose here is to learn the protein tolerance, and to cover protein loss as quickly as possible. Fat is somewhat less urgently needed, except in very weak and emaciated patients; it can be added gradually, as conditions seem to indicate. An element of bulk in the diet is necessary to give the comfortable feeling of fullness and to prevent constipation. This is the great advantage of green vegetables. When they are fed raw, or cooked in steam, or boiled and evaporated so that no water is thrown away, they contain a definite quantity of carbohydrate besides valuable salts; and this is the only form of carbohydrate that patients thus treated ordinarily receive. Some cases are so severe that even green vegetables cannot be tolerated. Under these conditions the vegetables may be boiled through three waters, throwing away all the water. Nearly all starch is thus removed, and the most severe cases generally take these thrice-cooked vegetables gladly and without glycosuria.

One result of the initial program described is the loss of weight. The attempt to put on weight, Allen says, is one of the surest ways of bringing back all the symptoms and sending the patient down hill. It is probably one of the chief causes of past failures in

treating severe diabetes. In the severe cases it is found necessary to restrict all classes of food, and to test the tolerance of each patient for each particular class. Carbohydrate is given if possible, but is kept safely below the limit of tolerance. Protein must be kept fairly low, sometimes very low. With a dangerously low protein tolerance the working rule has been to exclude all carbohydrate, then feed as much protein as is possible without glycosuria.

ACIDOSIS

Ever since the danger of acidosis has been recognized and the likelihood of acidosis being caused by a sugar and carbohydrate-free diet in this disease, physicians have been constantly on the alert to recognize this condition by a study of the urine. The indicator of danger has been considered to be the finding of diacetic acid in the urine. This is of ready determination by a ferric chlorid solution added to the urine causing the development of a red or crimson color. The precipitate of phosphate of iron thus produced may obscure the tint characteristic of the reaction. The urine should then be filtered and an excess of ferric chlorid solution added to the filtrate. It has been found, however, that this reaction could be present and still not be a positive indication of the amount of beta-oxybutyric acid that is in the urine or the nearness of an actual toxic acidosis. The determination of the beta-oxybutyric acid is tedious. The same is true, more or less, of acetone and ammonia that may be present in the urine. Therefore the tests must be made in the laboratory and should be made frequently when a diabetic patient's diet is being gradually reduced to pure proteid and fats. By such careful examination it has been lately learned that the presence of these acids in the urine is not necessarily an indication that the diet must become more liberal or that starch should be immediately given. Of course if symptoms of diabetic coma are present very large amounts of alkalies must be administered and starch in liberal quantities must be immediately allowed.

If coma is considered to be imminent, carbohydrates and alkalies should be given in large amount, and per-

haps no alkali is better than the bicarbonate of sodium in two-gram doses (30 grains), in water, every hour for several doses. If the danger is past the diet should be liberal, with the free use of starches, until the urine is again free from diacetic acid. However, when coma is pending it is often impossible to prevent its occurrence, and the treatment of such a condition is the prevention, viz., the patient should receive, if seen in time, such a diet as to minimize the occurrence of coma. Alkalies may be given intravenously in the form of the well known Fischer solution which is also given per rectum by the continuous drip method.

COMPLICATIONS AND SEQUELAE

It should be remembered that a generalized and persistent furunculosis may be an unpleasant accompaniment of diabetes. Diabetic gangrene is another condition which may appear in the course of this disease and necessitate operation. Operations on diabetics are notoriously dangerous and usually undertaken only when deemed a life-saving measure.

Addis (*Jour. A. M. A.*, April 3, 1915, p. 1130) considers the necessary preparation of diabetics for operation. One method of preparing diabetic patients for operation is to give them a sugar and starch-free diet. This is a useless procedure, according to Addis, because, although it may reduce the degree of hyperglycemia and the amount of sugar in the urine, it will not lessen any of the risks of operation; it is dangerous, since it increases the chances of the onset of diabetic coma. When operation is not immediately necessary, and especially in those cases in which the decision as to whether or not an operation shall be performed rests largely on the question as to how much danger would be run by the patient after the operation because of his diabetic condition, it would be a great advantage to have some objective data to supplement the facts relative to this point, which can be gained by clinical observation. The quantity of sugar in the urine is no aid in this respect, for the special danger to life is the failure, not of the sugar, but of the fatty acid metabolism. The coma in which diabetic patients die after operation is, often at least, accompanied by the excre-

tion in the urine of large amounts of unoxidized fatty acids, and there is good reason for believing that the condition is due to poisoning by these acids. The inability of the kidneys to excrete large amounts of fatty acids is a factor in the production of diabetic coma. The giving of alkali helps the kidneys in this work. Before operation, therefore, it is important to give alkali until the urine becomes alkaline, and to maintain if possible this alkaline reaction after operation. Neither success in inducing a storage of glycogen in the body before operation, nor in keeping the urine alkaline is an absolute barrier against diabetic coma. They are only palliative measures. All those circumstances which unite together to produce shock are factors which act as exciting causes of the condition known as diabetic coma. It is possible to mitigate the action of these agencies by the application of the principles of "anoci association."

DIABETES INSIPIDUS

This condition is recognized by the excretion of large quantities of non-sugar-containing urine, not directly due to an excessive intake of fluids (polydipsia). Connected etiologically with this condition the following have been mentioned: cerebral irritation, diseases and injuries of the cerebrum, diseases of the pituitary body, and finally, a primary cause in the kidney.

The diagnosis of the cause of diabetes insipidus having been made, the treatment may be aimed more or less successfully to cure the condition, or to prevent the operation of the cause. A simple polyuria from overdrinking can, of course, be easily prevented. Nervous causes may be modified if there is not actually some pathologic condition in the brain. If the blood-pressure is high, the lowering of it by proper baths, massage, physical exercise, change to a warm climate, diet, or by vasodilators will prevent it. Polyuria may, however, occur with low blood-pressure causing perhaps some disturbance of the brain, as theoretically low blood-pressure should not cause diabetes insipidus. Such instances may be helped by the vasoconstrictor drugs, and especially by ergot. It is possible that this effect

of ergot is due to its action in preventing cerebral irritation, cerebral congestion, and possibly the slight cerebral exudate that may occur.

GOUT

The etiology of gout is unknown. It is generally believed to be connected in some way with an imperfect or deranged metabolism of purins. Among various predisposing causes are heredity, alcohol, habits, over-eating, etc.

Among the prominent symptoms are chalky deposits, tophi in the ears, gouty joints, with accompanying shooting pains, increased arterial tension and gastrointestinal upsets.

The individual joints may be treated, as has been mentioned under arthritis, by rest, moist sedative fomentations, morphin to stop pain, etc. As internal medication the salicylates, colchicum, atophan and novatophan have been especially recommended. The diet in gout should logically be purin-free. Fish and flesh of all kinds should be prohibited. Alcoholic stimulants which increase the formation of uric acid should not be allowed. Rich soups, fried foods, radishes, asparagus, tomatoes and dried beans are best omitted from the diet as are preserves, candies, pies, pastries, etc.

The patient should take a moderate amount of plain nutritious foods. Eggs, fresh vegetables, except such as have been excluded, various cereals, and fresh fruits and milk may be freely eaten. Meats, oysters, etc., may at times be taken with caution.

OBESITY

Obesity is a condition accompanied by the accumulation of extraordinary, therefore pathologic quantities of fat. Unless causing definite functional disturbance no treatment is necessary. A reference to the table of height and weight at varying ages in the front section of the book will indicate what is normal.

The treatment of obesity must include primarily a regulation of the diet to prevent the feeding of excess food over what the body can utilize and a regulation of body work to produce a demand for energy giving constituents.

DIET

The number of diets which have been offered for obese persons is almost legion. Certain general principles must be observed. An average of several of the best known diets is as follows: Protein, 140 gms., fat, 40 gms., carbohydrates, 90 gms., calories, 1,320. It can be taken as a matter of fact that most people eat too much. The appetite may be better controlled and hunger appeased by small quantities of food taken frequently. Depressing of the appetite is commonly advised and may be accomplished in several ways, notably by long chewing of the food and limitation of the variety. Sternberg believes that drugs should be used to prevent hunger and reduce the appetite. He has found preparations of iodine particularly useful for this purpose. The anesthetization of the mucous membrane of the stomach also aids in warding away hunger. Peppermint lozenges and menthol tablets reduce the sensibility of the mucosa and minute doses of camphor seem to produce a feeling of fulness. Coffee taken early in the meal has long been advocated by Sternberg as it reduces appetite and lessens the usual desire of the overcorpulent to sleep.

Friedenwald and Ruhrah give the following general directions: Avoid sugars and starchy food and take little or no fatty food. Eat sparingly and take but little fluid—and that apart from meals. Obese persons may eat small quantities of chicken, beef, oyster, bouillon or clam soups; meat once daily consisting of beef, lean, raw, scraped, boiled or broiled; steak, broiled; mutton, roasted; chops, broiled; chicken, boiled or broiled. Eggs should be eaten only soft boiled or poached. Of fish the following may be taken: oysters, raw; mackerel, rock or trout, boiled. Vegetables are best taken mashed and strained. Of bread, but a small quantity should be allowed and then only in the form of stale wheat bread, zwieback, toast, graham or gluten bread. The following fruits, all of which are acid, may be recommended: lemons, oranges, raw apples, grapes, raw peaches, berries and cherries. Water should be taken sparingly at meal times. Tea and coffee may be taken but without sugar or milk.

Mineral waters ordinarily may be allowed in quantity sufficient to assuage thirst without causing disagreeable symptoms.

The following articles of diet should not be taken: rich soups, fried foods, pork, veal, stews, hashes, corned meat, potted meat, liver, kidney, duck, goose, sausage, crabs, lobsters, preserved fish, smoked or salted fish, salmon, bluefish, salt mackerel, herring, hominy, oatmeal, rice, puddings, sardines, celery, potatoes, turnips, carrots, parsnips, sweet potatoes, beets, hot bread or cakes, nuts, candies, pies, pastry, alcoholic stimulants.

HYDROTHERAPY

The use of cold baths in the treatment of obesity as well as special forms of hydrotherapy is generally well known. Besides improving the skin and aiding the circulation, it seems likely that such baths also accelerate the loss of fat.

EXERCISE

In the presence of circulatory disorders the prescription of exercise must be cautious. Otherwise it is a valuable aid in producing a loss of weight.

Walking and horseback riding, swimming and graded calisthenics, may be of value. Golf and tennis may likewise be indicated if the physician thinks proper.

Massage, if given vigorously and accompanied by passive motion sometimes produces marked results, especially in those of markedly sedentary habits.

The Zander apparatus produces passive mechanical exercise. Besides such machines others combining weight lifting, pushing, pulling and stretching movements may be employed in suitable cases.

Bergonie has designed an apparatus which acts on the essential principle that the whole musculature of the body shall be stimulated by electric excitation to painless, rhythmic, passive contractions. Several observers have reported marked permanent losses in weight under such treatment. It has also been said that the method is a severe one and not to be continued too long at a single sitting because of the danger to the heart musculature.

MEDICINAL TREATMENT

Obesity cures of a fraudulent nature are legion. In most instances they are either dangerous or worthless, or both. Thyroid extract has been and still is the basis of many so-called "fat reducers." Lemon juice has had its day and numerous iodid preparations have been exploited. Bladderwrack, a form of seaweed, has likewise had a peculiar vogue. Among a number of obesity cure fakes which have been included in a pamphlet issued by *The Journal of the American Medical Association* may be mentioned: Marjory Hamilton's Obesity Cure, Texas Guinan, Turner Triplex System of Weight Reduction, Berledets, Every Woman's Flesh Reducer, "Get Slim," Kellogg's Safe Fat Reducer, Rengo, Marmola and Louisenbad Reduction Salt.

Von Noorden believes there is an endogenous constitutional type of obesity which he regards as traceable to thyroid functioning. Congenital or acquired weakness or degeneration of the thyroid may induce the obesity directly or the thyroid may become a factor in the obesity only secondarily, as in case of pancreas disease (demonstrated only experimentally as yet); disease in the ovaries or testicle (deficiency of the interstitial substance); disease in the pituitary body (adipose-genital dystrophy); disease in the pineal gland or thymus (both dubious). There may also be a combination of both the exogenous and endogenous type, especially in the young.

Throughout the endogenous forms, abnormal thyroid functioning is common to all, and treatment of constitutional obesity must be based on thyroid treatment. It is unquestionable now that the reliance on thyroid treatment is increasing, the dread of it diminishing. The dangers from thyroid treatment are just as great as ever, but we know better how to watch out for them and guard against them. He adds that even in cases amenable to systematic dietetic measures alone, the prolonged restriction of the diet seems to him more of an evil than a course of thyroid treatment. With this the diet need not be so strictly regulated and the effect of the thyroid treatment is often permanent, so that the patients can eat like

other people afterward without bringing back the obesity. During the thyroid course ample provision of albumin should be ensured. The urine should be examined often for sugar. The tendency to acceleration of the heart action and drop in blood pressure can be warded off by daily small doses of some digitalis preparation. The thyroid seems to lead to an increase of oxygen consumption and carbon dioxid excretion. If used it may be given in doses of one to two grains twice or three times daily and increased only very cautiously.

DISTURBANCES OF THE HEART

Of late years the disturbances of the heart are beginning to assume a more prominent place in the list of causes of death, so that perhaps only tuberculosis and kidney disturbances are more prominent. It has been said that although the majority of sudden deaths are due to a cardiac cause, there are few chronic diseases so amenable to treatment and so compatible with long life and comfort, if judiciously handled, as cardiac cases. Of late years also there have come into prominence numerous delicate methods of examining the heart's functioning, testing its rate and its rhythm. These newer methods have pointed the way toward efficacious therapeutic measures.

THE PREVENTION OF CARDIAC DISTURBANCES

Although we shall consider under each heading the various elements in the etiology, it may be worth while here to take up some of the more general factors which produce cardiac disturbances.

Recent studies of focal infections have shown that a tonsillitis, an abscessed tooth, etc. may be the origin from which spring germs that later may cause an endocarditis, or valvular infection.

Patients are likely to manifest a desire to become active too soon after a serious illness or a surgical operation. The physician or surgeon should not submit his patient to such strenuous cardiac tests. If the patient manifests a marked rapidity in the heart rate on first sitting up in bed, cautious consideration should be given to his symptomatology before allowing him to arise.

Schumacher and Middleton have called attention to the serious cardiac disturbances in young men who have indulged too vigorously in modern athletic competition.

ACUTE PERICARDITIS

Pericarditis is almost invariably a secondary condition, the most frequent infectious cause being rheumatism, others being cerebrospinal fever, acute miliary tuberculosis, pneumonia and sepsis. Accidental causes are traumatism, and an adjacent inflammation of the pleura. Pericarditis may also be terminal in nephritis, adjacent abscesses, cancer and other new growths. The prevention of the disease must then be related to the removal of the cause.

TREATMENT

Of primary importance in the treatment of pericarditis is rest. The patient should have absolute rest. He should not be allowed to sit up in bed even to eat or attend to the calls of nature. He should have no visitors. Anything that increases the heart beat increases the irritation of the inflamed surfaces of the pericardium.

Just what can be done locally or generally to combat the inflammation actively must depend on the cause. When the inflammation occurs as a complication of acute rheumatism, it has been suggested that salicylates, which do not inhibit rheumatism and may be depressant to the heart, should be stopped if they are being administered; but if the salicylates are apparently improving the inflammation in the joints, pericarditis would not contra-indicate their continued use. Except in large doses, salicylates probably do not depress the heart. In pericarditis it is perhaps well always to administer an alkali in some form unless otherwise contra-indicated, whether the cause is rheumatism or not. A diminished alkalinity of the blood would always increase the likelihood of an augmented amount of pericardial or endocardial inflammation. Alkalies may be freely given. It is possible that one of the reasons why pericarditis or endocarditis occurs so frequently in serious prolonged fevers is that the patient has not eaten enough cereals or other carbohydrates, and the system has become more or less endangered by acidosis. In other words, carbohydrate starvation is inexcusable with our present understanding of the danger from acidemia and even from a diminished amount of alkalies in the blood.

The causes of pericarditis being so varied, any anti-toxin treatment or any vaccine treatment could be indicated only if the cause of the inflammation rendered the serum or vaccine advisable.

The most valuable local treatment is cold, which may be applied either in the form of an ice-bag or by a small coil through which ice-water is caused to flow by siphonage. Cold may be applied more or less continuously, depending on the sensations of the patient. The bag or ice-cap must not be overfilled and must not be heavy, as the patient often cannot stand pressure over the pericardium. Sometimes the relief from pain and the diminution of the number of the heart-beats is marked, and from this reason alone the cardiac inflammation may be inhibited. If cold applications are not tolerated by the patient (and they often are not in children) warm applications may be used, such as flaxseed poultices, or cloths wrung out of hot water and covered with oil-silk, and the pain will often be relieved thus. While hot applications would not tend to abort the inflammation, they probably do not tend to promote it.

A diminished diet, of small amount at a time, and such purging as the patient's strength will allow are essential in attempting to curtail the seriousness or amount of this inflammation.

Stopping the Pain.—Nowhere else in the body should pain be so speedily combated as when it occurs in the region of the heart. Morphin should be administered as needed to control the pain. The ice-bag may often be used to advantage to obviate the frequent need of morphin. If morphin is contra-indicated other sedatives may well be employed. Ergot may be used, especially if there are cerebral symptoms and if the arterial tension is low. It is best administered by injection of an aseptic preparation deep into the muscles.

The Exudate.—It is not known how much is to be gained by indirect measures tending to prevent exudation and hasten resorption of the exudates. However, purging, diuresis and local application of blisters have been employed for these purposes. The saline purges are best employed if the heart is strong. If the circula-

tion is weak, the vegetable purgatives or calomel may be employed.

For diuresis potassium citrate or if the heart muscle is in good condition, digitalis, may be employed.

Small blisters over or around the heart have sometimes seemed to be of service in hastening resorption of exudates. Small doses of sodium iodid 0.2 gm., or 3 grains, three times a day, may be given for this purpose.

The intake of food and especially of fluids should be decreased but the nutrition of the patient should not be allowed to suffer.

If in spite of all the therapeutic measures suggested, the fluid increases and the pericardium becomes more distended and the heart's action more labored, paracentesis must be done. The point where the aspirating needle should be inserted into the pericardium depends somewhat on the conditions in each individual case. It is often best to insert an exploratory needle first. This will determine the fluidity and character of the exudate. If pus is found, a more radical surgical procedure than simple paracentesis must be done immediately. The point of puncture for aspiration most frequently chosen is in the fourth or fifth intercostal space, about an inch to the left of the sternal margin. Paracentesis is also often done in the region of the normal apex-beat. The position of the patient is determined by his dyspnea; he should lie in the position most comfortable for him. The fluid should be withdrawn slowly and the pulse carefully watched. The withdrawal of a small amount of fluid may later seem to be the starting cause of resorption of the rest of the fluid. On the other hand, it often accomplishes nothing but the removal of the immediate pressure, the fluid may again accumulate, and more radical surgery must be performed.

Convalescence.—The convalescence should be prolonged as in any other cardiac inflammation. The patient should be given more and more nourishing food, and the iron tonic may be changed to a capsule containing 0.05 gm. of quinin and 0.05 gm. of reduced iron, three times a day.

It is a question as to when patients convalescent from pericarditis should be permitted exercise. It has been thought that gentle movements and possibly exercise, sooner than theoretically justified, might cause the heart to beat a little more actively and possibly prevent the formation of tight adhesions between the two layers of the pericardium. Whether such activity of the heart will prevent adhesions is something that has not been determined.

The small doses of sodium iodid, perhaps 0.2 gm. (3 grains) two or three times a day, should be continued for some time. Iodid in this dosage does no harm and may do a great deal of good.

MYOCARDIAL DISTURBANCES

The condition of the myocardium or heart muscle is often the determining factor as to whether a patient shall live or die. If the myocardium be degenerated at the end of a long severe illness, a too rapid attempt at a return to ordinary activities may bring about a dilatation of the heart which is itself responsible for sudden death or prolonged disability.

ACUTE MYOCARDITIS

Practically all acute infections cause more or less myocarditis. It is exceedingly rare indeed that an endocarditis occurs without an accompanying myocarditis. The condition is not diagnosed until a sudden acute dilation calls for emergency treatment.

The symptoms are often indefinite. As acute myocarditis develops the apex beat is less positive, less accentuated and later diffuse and feeble. The closure of the aortic valve is less typically sharp, showing that the blood vessels are not so thoroughly filled. The peripheral circulation may not be active, the blood pressure falls, and the heart becomes more rapid, especially after exertion.

The prevention of this condition must be rest. Patients should not be allowed to make too rapid a convalescence after an infectious disease, a labor, or a surgical operation. Such cardiac tonics as digitalis should not be given; fluids should be diminished. The

circulation should be stimulated by warm or cold applications and massage carefully administered.

As a sedative morphin may be administered, and weakening perspirations may be counteracted by aspirin. Calcium may be administered to advantage, either as calcium lactate in doses of 4 grains three times a day, or calcium glycerophosphate in powder or capsule, 5 grains three times a day.

CHRONIC MYOCARDITIS

This is the term applied to a condition which is actually not an inflammation but a long continued degeneration. It is often a part of an arteriosclerosis. This being the case, the causes are any of the conditions which are associated with the appearance of arteriosclerosis: old age; syphilis; gout; repeated attacks of rheumatism; excesses, especially in food and alcohol; prolonged wasting diseases such as tuberculosis or cancer. The myocardial changes are sometimes associated with chronic pericarditis and chronic endocarditis, and may accompany or follow valvular disease of the heart.

The symptoms of chronic myocardial degeneration are progressive weakness, slight at first, noticeable on exertion; the pulse frequently becomes more rapid. There is likely to be edema of the lower extremities toward night. The amount of urine may diminish. The pulse may become intermittent, and then irregular.

The physical signs often show an enlargement of the heart. Such a heart may act perfectly until a sudden exertion causes it to weaken, giving cardiac distress signals, the patient becoming prostrated for a variable period. Slight cardiac pains and sensations referred to the cardiac region become frequent.

TREATMENT OF CHRONIC MYOCARDITIS

Patients with this disturbance should avoid physical effort and mental weariness; should avoid the swamping of the circulation with fluids; should reduce the quantities of food taken; should cause daily free movements of the bowels; should take warm baths daily to clean the skin and promote perspiration; should take a correct amount of cautious exercise or

undergo carefully directed calisthenics or massage. The patient should avoid chilling the body or placing any other sudden strain on the weakened heart musculature. Complete rest one day a week and one month in the year may aid in prolonging life.

It is inadvisable to give nitrites if the blood pressure is low. If there is a high blood pressure nitroglycerin or other nitrites may be given.

When an iodid is deemed advisable, the potassium or the sodium salt may be used, and either may be given in a saturated solution or in a solution of which a dose would be a teaspoonful.

There is no syrup or tasteful menstruum that will well disguise the taste of an iodid. It is much better to give these preparations in water and allow the patient to take them either in milk or effervescing water, or in any solution that he may prepare to suit his taste, or he may follow the drug with any taster that he desires.

| | | |
|-------------------------------|-------------|---------------|
| | Gm. or c.c. | |
| R Sodii iodidi..... | 20 | or 3 v |
| Aquae ....q. s. ad saturandum | \| | q. s. ad sat. |

M. et Sig.: Five drops, in water, three times a day, after meals.

[Each minim represents about .065 gram or 1 grain of the drug. A drop, however, of a saturated solution is less than a minim.]

Or:

| | | |
|------------------------|-------------|----------|
| | Gm. or c.c. | |
| R Potassii iodidi..... | 6 | or 3 iss |
| Aquae 100 | \| | flʒ iii |

M. et Sig.: A teaspoonful, in water, three times a day, after meals.

If, in spite of this management and treatment, the patient has cardiac asthma attacks, with or without pain, especially if there are pendent edemas, the question arises as to whether or not digitalis should be given. In such cases one cannot tell without trying whether digitalis will be of benefit or will cause more discomfort. A small dose of an active preparation should be given at first twice in twenty-four hours, and after a week once in twenty-four hours, its action being carefully watched and the decision as to whether the dose is too large or too small arrived at.

ENDOCARDITIS

Acute endocarditis rarely if ever occurs without some myocarditis, and not infrequently pericarditis also accompanies these conditions. Endocarditis is divided for discussion into acute mild (simple) endocarditis; acute malignant (ulcerative) endocarditis; chronic endocarditis and valvular disease.

ACUTE MILD ENDOCARDITIS

It has been shown positively that acute endocarditis is due to micro-organisms, generally streptococci, staphylococci or pneumococci, and, more frequently than once believed, gonococci. The most frequent causes are acute rheumatic fever, diphtheria, pneumonia, cerebrospinal meningitis, scarlet fever, erysipelas, influenza, chorea, gonorrhea, sepsis and typhoid fever. It may also follow a follicular tonsillitis which is rheumatic in type but has not caused arthritis. Tuberculosis may also occasionally cause an endocarditis. Organisms may be found in a terminal simple endocarditis due to a chronic disease, as tuberculosis or cancer; such inflammations may have been caused by circulating toxins.

This inflammation of the endocardium is generally confined to the region of the valves, and the valves most frequently so inflamed are the mitral and aortic. There may be a slight inflammation or actual ulceration and loss of tissue. Vegetations more or less constantly occur on the inflamed surfaces, with more or less danger of particles becoming loosened and moving free in the blood-stream, causing embolic obstruction in different parts of the body. There is also more or less probability of serious adhesions or contractions occurring from the healing of the ulcerated surfaces. In other words, the future health and welfare of the valves depends on the fact that the inflammation has healed without contractions or adhesions.

It is often difficult to decide when acute endocarditis has developed, but with the knowledge that the endocardium often becomes inflamed during almost any of the acute infections, the physician should repeatedly examine the heart for murmurs, for muffled

closure of the valves, or for other evidences of endocarditis or myocarditis during the acute infective process.

SYMPTOMS

Among the early symptoms of endocarditis, which is often not recognized until the appearance of a valvular lesion, may be pain or discomfort about the heart and a rise in temperature. Frequently also there may be some dyspnea. Patients so afflicted are usually nervous and restless, and inclined to show anxiety on strenuous movement.

TREATMENT

In the treatment of acute mild endocarditis, rest, both mental and physical, is of primary importance. This should extend over four to six weeks and should be absolute. To counteract muscular flabbiness, massage should be given, extending from simple rubbing and kneading to passive movements.

Locally the application of cold is most useful. Ice bags should not be applied directly to the skin, but the latter should be covered with a light piece of flannel. A blister usually causes more discomfort than it does good.

The medicinal treatment includes the use of alkalis. These may be given as potassium citrate in doses of 2 gm. every three to six hours in wintergreen water. If the salicylates are being given, as they should be, to counteract rheumatic infection, sodium bicarbonate may be given in equal dosage. To counteract the anemia likely to develop, iron may be administered as 5 drops of the tincture of the chlorid in lemonade or orangeade, twice in twenty-four hours. A 3 grain tablet of saccharated oxid of iron may be given twice in twenty-four hours. Pain may be combated by the use of morphin in adults or codein if the patient be a child.

For marked nervousness and restlessness, the bromids may be of value and in case of insomnia, chloral or sodium-ethyl-barbiturate may be used, a dosage of 3 to 5 grains being ordinarily sufficient.

Diet.—The diet should at first consist largely of ilk and cereals with a moderate amount of fluid and

alkaline drinks. During convalescence a full diet may be prescribed, especially milk, eggs and fresh vegetables. The bowels should be kept open but a too brisk catharsis is inadvisable. It is better to regulate the bowels by simple measures such as proper foods, etc.

The correct use of cardiac drugs is a difficult problem. If there is myocardiac inflammation digitalis is inadvisable as is the case in the presence of much endocardial inflammation. If there are signs of failure of the cardiac muscle, camphor or strophanthin have been advised when rapid stimulation is needed.

For hyperpyrexia and profuse perspiration, the surface of the body should be sponged with cold, lukewarm or warm water. Too profuse sweating may be combated with atropin.

MALIGNANT (ULCERATIVE) ENDOCARDITIS

Ulcerative endocarditis may develop from the mild type or independently of it. It is essentially a septic process and may develop from a local focus of infection elsewhere in the body. The process may include disintegration of the heart muscle and deep points of erosion as well as little pockets of pus or abscesses in the muscle tissue.

The diagnosis is not so difficult if this condition develops on a mild endocarditis as when it appears primarily. The temperature is generally intermittent, accompanied by chills. There may be prostration and profuse sweats.

Meningeal symptoms—headache, restlessness, delirium, stupor—are not uncommon and convulsions may occur. Enlargement of the spleen and congestion of the liver may be found. Albumin appears in the urine. Definite cardiac symptoms and cardiac weakness eventually dominate the picture. Ecchymotic spots may appear over the body. If emboli break off and are carried to different parts of the body they bring about symptoms of embolism in that part. If mycotic, they may set up a local focus of infection; if lodging in a terminal artery gangrene of the part concerned takes place, necessitating amputation, or perhaps being itself the cause of death.

TREATMENT OF MALIGNANT ENDOCARDITIS

If pneumonia or gonorrhea is supposed to be the cause of the endocarditis, injections of stock vaccines should perhaps be used. If the form of sepsis was not determinable, streptococci or staphylococci vaccines might be administered. It is still a question whether such "gun-shot" medication with bacteria is advisable. Patients recover at times from almost anything, and the interpretation of the success of such injection treatment is difficult. Exactly how much harm such injections of unnecessary vaccines can produce in a patient is a question that has not been definitely decided. Theoretically an autogenous vaccine is the only vaccine that should be supposed to be successful with our present knowledge. The vaccine treatment of ulcerative endocarditis was not shown to be very successful by Dr. Frank Billings in his investigation of the subject.

Other treatment of malignant endocarditis includes treatment of the condition that caused it plus treatment of "mild" endocarditis, as previously described, with the meeting of all other indications as they occur. As in septic processes, the nutrition must be pushed to the full extent to which it can be tolerated by the patient, namely, small amounts of a nutritious, varied diet given at three-hour intervals.

Whether milk or any other substance containing lime makes fibrin deposits on the ulcerative surfaces more likely or more profuse, and therefore emboli more likely to occur, is perhaps an undeterminable question. In instances in which hemorrhages so frequently occur, as they do in this form of endocarditis, calcium is theoretically of benefit. Quinin has not been shown to be of value, nor has salicylic acid, unless the cause is rheumatism. Alcohol has been used in large doses, as it has been so frequently used in all septic processes. If the patient is unable to take nourishment in any amount, small doses of alcohol may be of benefit. It is probably of no other value. It is doubtful whether ammonium carbonate tends to prevent fibrin deposits or clots in the heart, as so long supposed. In fact, whenever the nutrition is low and the patient is likely to have cerebral irritation from acidemia, whenever the

kidneys are affected, or whenever a disease may tend to cause irritation of the brain and convulsions, it is doubtful if ammonium carbonate or aromatic spirit of ammonia is ever indicated. Ammonium compounds have been shown to be a cause of cerebral irritation.

Intestinal antiseptics may be attained more or less successfully by the administration of yeast or of lactic acid ferments together with suitable diet. The nuclein of yeast may be of some value in promoting a leukocytosis. It has not been shown, however, that the polymorphonuclear leukocyte increase caused by nuclein has made phagocytosis more active.

Malignant endocarditis may prove fatal in a few days, or may continue in a slow subacute process for weeks or even months.

CHRONIC ENDOCARDITIS

It is not easy to determine when a subacute endocarditis becomes chronic. The process manifests itself by a gradual sclerosis of the valves. It should be treated on the same principles as the acute type depending largely on the supposed cause of the disease.

CHRONIC VALVULAR DISEASE

As has been indicated, chronic valvular disease arises commonly as the result of acute or chronic endocarditis, the former from infections, the latter perhaps associated with syphilis, alcoholism, gout, etc.

The valvular disease may narrow or constrict the opening, giving rise to so-called stenosis; or it may render the valves incapable of closing correctly, so-called insufficiency. Because of its increased work the heart muscle may hypertrophy. As long as this hypertrophy is adequate the heart continues its work satisfactorily and the valvular lesion is said to be compensated. When the muscle is degenerated it may be unable to accomplish its work and is said to fail, and symptoms of cardiac failure appear. As the heart chambers overfill and are emptied with difficulty, dilation takes place.

THE COMPENSATED HEART

As long as compensation is complete no medication or physical treatment is necessary. However, such a patient should so order his life as to throw no special strain on the taxed organ. Severe athletic efforts, rushing up and down stairs, prolonged tension, extreme worry are to be interdicted. Tobacco and alcohol, tea and coffee should not be taken. Ordinary diseases occurring in such patients should be treated with exceptional watchfulness of the circulation.

MITRAL STENOSIS

Perhaps 60 per cent. of mitral stenosis, which occurs most commonly between the ages of ten and thirty, has its origin in rheumatic endocarditis. This lesion is a serious handicap in such diseases as pneumonia, pleurisy or bronchitis, in which there is congestion of the lungs.

Among the more important symptoms are a murmur, diastolic and perhaps presystolic, heard over the left ventricle and accentuated at the apex. Usually there is an accentuated pulmonary closure. The pulse is generally slow; dyspnea on exertion is common and an increase in mucus in the throat is not infrequent.

As weakening of the compensation occurs, the heart beat becomes irregular; there is venous congestion of the head and face, blueing of the lips and sometimes hemoptysis. These patients suffer more or less from cold extremities.

Besides the usual treatment for broken compensation in patients with this lesion, digitalis is of the greatest value, and the slowing of the heart by it, allowing the left ventricle to be more completely filled with the blood coming through the narrowed mitral opening during the diastole, is the object desired. This drug acts similarly on both the right and left ventricles, and though there is no real occasion for stimulation of the left ventricle, and it is the right ventricle that is in trouble, dilated and failing, still a greater force of left ventricle contraction helps the peripheral circulation. The action on the right ventricle contributes greatly to the relief of the patient by sending the blood through the lungs and into the left

auricle more forcibly, and the left ventricle receives an increased amount of blood, the congestion in the lungs is relieved and the dyspnea improves. Perhaps there is no class of cardiac diseases in which more frequent striking relief can be obtained than in these cases of mitral stenosis.

If the congestion of the lungs is very great and death seems imminent from cardiac paralysis, if cyanosis is serious and bloody, frothy mucus is being expectorated, venesection and an intramuscular injection of aseptic ergot may be indicated. Digitalis should also be given, hypodermatically perhaps, but its action would be too late if it was not aided by other more quickly acting drugs, such as strophanthus. The physician may often save life by such radical measures.

MITRAL INSUFFICIENCY: MITRAL REGURGITATION

This is the most frequent form of valvular disease of the heart, and is due to a shortening or thickening of the valves, or to some adhesion which does not permit the valves to close properly, and the blood consequently regurgitates from the left ventricle into the left auricle during the contraction of the ventricle. Such regurgitation may occur without valvular disease if for any reason the left ventricle becomes dilated sufficiently to cause the valve to be insufficient. Such a dilatation can generally be cured by rest and treatment. As with mitral stenosis, the most frequent causes are rheumatism and chorea, with the occasional other causes as previously enumerated.

The characteristic murmur of this lesion is a systolic blow, accentuated at the apex, transmitted to the left of the thorax, generally heard in the back, near the lower end of the scapula, and transmitted upward over the precordia.

Of all cardiac lesions, this is the safest one to have. Sudden death is unusual, the compensation of the heart seems to be most readily maintained, and the patient is not so greatly endangered by overexertion or by inflammations in the lungs. As in mitral stenosis, any increase in blood-pressure—whether the normal increase after the age of 40, any continued earlier high tension or increase from occupation or exercise—

is serious as causing the left ventricle to act more strenuously, so that more blood is forced back into the left auricle, the lungs become congested, and the right ventricle, sooner or later, becomes incompetent.

When compensation fails with these patients, the first sign is pendent edema of the feet, ankles and legs; subsequently, if there is progressive failure of compensation, the usual symptoms occur.

The treatment is principally rest and digitalis, and the recovery of compensation, is often almost phenomenal. Patients with this lesion are likely to be children and young adults, and the heart muscle readily responds as a rule to the treatment inaugurated. Later, in these patients, or if the lesion occurs in older patients, the return to compensation does not occur so readily. If the condition is developed from a myocarditis or from fatty degeneration of the heart, it may be impossible to cause the left ventricle to improve so much as to overcome this relative dilatation or relative insufficiency of the valve. If the dilatation of the left ventricle is due to some poisoning such as nicotin, with proper treatment—stopping the use of tobacco, administration of digitalis, and rest—the heart muscle will generally recover and the valve again properly close.

AORTIC STENOSIS: AORTIC OBSTRUCTION

Valvular disease at the aortic orifice is much less common than at the mitral orifice, and while stenosis or obstruction is less common from rheumatism or acute inflammatory endocarditis than is insufficiency of this valve, a narrowing or at least the clinical sign of narrowing, denoted by a systolic blow at the base of the heart over the aortic opening, is in arteriosclerosis and old age of frequent occurrence. If such narrowing occurs without aortic insufficiency at the age at which it usually occurs, it may not seriously affect the heart. It may follow acute endocarditis, but it most frequently follows chronic endocarditis or atheroma, in which the aortic valves become thickened and more or less rigid; this condition most frequently occurs in men.

Anything that tends to increase arterial tension, as tobacco, lead or hard work, or anything that tends to

cause arterial disease, as alcohol or syphilis, is often the cause of this lesion.

At times the edges of the valves may grow together from ulcerative inflammation, and the lumen thus be diminished in size; or projecting vegetations may interfere with the opening of the valve and with the flow of blood. With such narrowing the left ventricle more or less rapidly hypertrophies to overcome its increased work.

The murmur caused by this lesion is a systolic one, either accentuated in the second intercostal space at the right of the sternum, or perhaps heard loudest just to the left of the sternum in this region. The murmur is also transmitted up the arteries into the neck, and may at times be heard in the subclavian arteries. It may also be transmitted downward over the heart. The pulse is slow, the apex of the rise of the sphygmographic arterial tracing is more or less sustained and rounded, and the rise is much less than normal.

If this lesion occurs in old age, there is general arterial disease present and the tension and compressibility of the arteries vary, depending on how much they are hardened. The disturbed circulation is evidenced by imperfect peripheral circulation and capillary sluggishness, with at times pendent edema of the feet and ankles, but, perhaps, little congestion of the lungs. The left ventricle being sufficient, there is no damming back through the left auricle to the lungs. The left ventricle may, however, become weakened, either by some sudden strain or by a chronic myocarditis, and relative insufficiency of the mitral valve may occur. The subsequent symptoms are typically those of loss of compensation.

This lesion may allow a patient to live for years, provided no other serious disturbance of the heart occurs, such as myocarditis or coronary disease; but sooner or later, with the failing force of the blood-flow and the lessened aortic pressure, slight attacks of anemia of the brain occur, causing syncope or fainting. Also, sooner or later these patients have little cardiac pains. They begin to "sense" their hearts. Their may not be actual anginas, but a little feeling

of discomfort, with perhaps pains shooting up into the neck, or a feeling of pressure under the sternum. Little excitements or over-exertions are likely to make the heart attempt to contract more rapidly than it is able to drive the blood through the narrowed orifice, and this alone causes cardiac discomfort and the feeling of cardiac oppression.

It is essential, then, that these patients should not hasten and should not become excited; and any drug or stimulant that would cause cardiac excitement is bad for them. On the other hand, these are the very patients in whom, sometimes, alcohol in small doses may be advisable, especially if the patient is old; and a dose of alcohol used medicinally when an attack of cardiac disturbance is present is good treatment. The quick dilatation is valuable. Nitroglycerin will also do good work in these cases, and with high blood-tension may be the only safe drug for the patient to have on hand. As soon as his attack occurs, with or without real angina pectoris, let him dissolve in his mouth a nitroglycerin tablet. If he feels faint, he will feel better the moment he lies down, and in this instance he may be improved by a cup of coffee, or a dose of caffeine, camphor or ammonia.

If the left ventricle becomes still weaker and shows signs of serious weakness, or if there is actual dilatation, the question of whether or not digitalis should be used is a subject for careful decision. The left ventricle should not be forced to act too sturdily against this aortic resistance. Consequently the dose of digitalis must be small. On the other hand, it frequently happens, especially in old age, that myocarditis or fatty degeneration has already occurred before this cardiac weakness develops in the presence of aortic narrowing, and digitalis may not be indicated at all. We cannot tell how far degeneration may have gone, however, and small doses of digitalis used tentatively and carefully, perhaps two or three drops of an active tincture two or three times a day, and then the drug carefully increased to a little larger dose to see whether improvement takes place, is the only way to ascertain whether digitalis can be used with advantage or not. If it increases the cardiac

pain and distress, it should not be used. Strychnin is then the drug that should be relied on, with such other general medication as is needed, combined with the coincident administration of nitroglycerin, which may also be given in conjunction with digitalis, if deemed advisable. Generally, however, if a heart with aortic stenosis needs stimulation the blood-pressure is generally none too high, although there may be arteriosclerosis present. Therefore when nitroglycerin is indicated to lower blood-pressure, digitalis is not usually indicated; when digitalis is indicated to aid the heart, nitroglycerin is generally not indicated. These patients must have high blood-pressure to sustain perfect circulation at the base of the brain.

Patients who have this lesion should not use tobacco in large amounts, or sometimes even small amounts, as tobacco raises the blood-pressure and thus puts more work on the left ventricle; in the second place, if the left ventricle is failing, much tobacco may hasten its debility. On the other hand, with a failing left ventricle and a long previous use of tobacco it is no time to prohibit its use absolutely. A failing heart and the sudden stoppage of tobacco may prove a serious combination.

AORTIC INSUFFICIENCY: AORTIC REGURGITATION

This lesion, though not so common as the mitral lesion, is of not infrequent occurrence in children and young adults as a sequence of acute rheumatic endocarditis. If it occurs later in life it generally is associated with aortic narrowing, and is a part of the general endarteritis and perhaps atheroma of the aorta. Sometimes it is caused by strenuous exertion apparently rupturing the valve.

This form of valvular disease frequently ends in sudden death. On the other hand, it is astonishing how active a person may be with this really terrible cardiac defect. This lesion, from the frequent overdistension of the left ventricle, is one that often causes pain. While the left ventricle enlarges enormously to overcome the extra distention due to the blood entering the ventricle from both directions, the muscle sooner or later becomes degenerated from poor coro-

nary circulation. Unless the left ventricle can do its work well enough to maintain an adequate pressure of blood in the aorta, the coronary circulation is insufficient, and chronic myocarditis is the result. If the left ventricle has maintained this pressure for a long time, edemas are not common unless the cardiac weakness is serious and generally permanently serious; that is, slight weakness, in this lesion, does not give edemas as does slight loss of compensation in mitral disease, and unless the weakness of the ventricle is serious, the lungs are not much affected.

The physical sign of this lesion is the diastolic murmur, which is loudest at the base of the heart, is accentuated over the aortic orifice, and is transmitted up into the neck and the subclavians, and down over the heart and down the sternum with marked pulsations of the arteries (Corrigan pulse) and often of some of the peripheral veins, notably of the arms and throat.

If the left ventricle becomes dilated the mitral valve may become insufficient, when the usual lung symptoms occur, with hypertrophy of the right ventricle; and if it fails, the usual venous symptoms of loss of compensation follow. This lesion not infrequently causes epistaxis, hemoptysis and hematemesis.

Digitalis is always of value in these cases, but it should not be pushed. If a heart is slowed too much the regurgitation into the left ventricle is increased. Therefore such hearts should not be slowed to less than eighty beats per minute, or sudden anemia of the brain and sudden death may occur. These patients must not do hard work.

TRICUSPID INSUFFICIENCY

This rarely, if ever, occurs alone; it is generally a sequence of other valvular defects, and represents an overworked, dilated right ventricle. It may, however, occur from lesions of the lungs which impede the blood-flow through them. Such are fibroid changes in the lungs, emphysema, prolonged chronic bronchitis, the last stages of pulmonary tuberculosis, old neglected pleurisies with cirrhosis or fibrosis of the lung, and repeated attacks of asthma—anything,

whether valvular defect or pulmonary circulatory disturbance, that increases the pressure ahead and the work of this ventricle.

The symptoms are those of loss of compensation as described under other valvular lesions. There may be jugular pulsation, especially evident in the external jugular on the left side. The liver enlarges and may pulsate. There are edemas, dropsies, ascites and perhaps hemorrhages. The heart is enlarged and there is a soft systolic blow heard at the lower end of the sternum. The dyspnea is sometimes very great, and cyanosis may be present, especially during paroxysms of coughing.

This lesion of the heart is always benefited by digitalis, but the continuance of the improvement and its amount depend, of course, on the cause of the dilatation of the ventricle. Strychnin is often of advantage. These patients should rarely receive vasodilators, and hot baths, overheating, overloading the stomach and vigorous purging should never be allowed. Sometimes improvement will not take place until ascitic or pleuritic fluid, if present, has been removed.

TRICUSPID STENOSIS: TRICUSPID OBSTRUCTION

This is rare and probably always congenital, and is supposed to be due to an inflammation of the endocardium during intra-uterine life. In early childhood it is possible that it may be associated with left-side endocarditis.

A special treatment of the heart, if any is needed, would probably not be indicated unless there was associated tricuspid insufficiency, when digitalis might be used.

PULMONARY INSUFFICIENCY: PULMONARY REGURGITATION

If this rare condition occurs, it is probably congenital. A distinctive murmur of this insufficiency would be diastolic and accentuated in the second intercostal space on the left of the sternum. It should be remembered that aortic murmurs are often more plainly heard at the left of the sternum. Sooner or later, if

this lesion is actually present, the right ventricle dilates and cyanosis and dyspnea occur. Digitalis would therefore be indicated.

PULMONARY STENOSIS: PULMONARY OBSTRUCTION

If stenosis is actually present in this location, the lesion is probably congenital. It might occur after a serious acute infectious endocarditis, but then it would be associated with other lesions of the heart. It has been found to be associated with such congenital lesions of the heart as an open foramen ovale or foramen Botalli, or with an imperfect ventricular septum, and perhaps with tricuspid stenosis—in short, a cardiac congenital defect. The right ventricle becomes hypertrophied, if the child lives to overcome the obstruction.

The physical sign is a systolic blow at the second intercostal space on the left; but as just stated, such a murmur must surely be dissociated from an aortic murmur if found to develop after babyhood, and it should also be diagnosed from the frequently occurring hemic, basic and systolic murmurs; that is, if signs of pulmonary lesions are not heard soon after birth or in early babyhood, the diagnosis of pulmonary defects can be made only by exclusion.

Unless the right ventricle is found later to be in trouble, there is no treatment for this condition. If the right ventricle dilates, digitalis may be of benefit.

ACUTE HEART ATTACK

The patient with valvular disease may suddenly be seized with an acute attack of agony in the heart region, dyspnea, and a feeling of oppression. A patient in this condition may die at any moment.

The immediate conditions to be met are the rapid fluttering heart, the nervous excitation and the vasomotor spasm, as well as the cardiac anxiety. Two factors of great importance are the establishment of self-control and confidence by the patient and the spontaneous relaxation following exhaustion. Morphin may be given even when there is no pain to aid in this relaxation. A too large dose should not be given because of the consequent depressing effect on the respiratory center. Atrophen may be given with

the morphin to overcome this effect. Such drugs should be given hypodermically as the patient is likely to vomit any mixture given by mouth. Nitroglycerin may be given hypodermically in dosage of 1/100 or 1/200 grain or a tablet may be dissolved on the tongue to aid in relaxing the peripheral vessels.

If the patient collapses with marked dyspnea, sub-normal blood pressure, cyanosis, feeble pulse, etc., and does not have the tension of fear, the treatment should be somewhat different. Aseptic ergot may be injected at once intramuscularly. If the patient has not been overpowered with digitalis it may be advisable to administer some form of this drug to obtain the future continued action.

Strophanthin may be given intravenously and in this way is a quickly acting stimulant. The dosage should be from 1/500 to 1/200 grain. Atropin or strychnin may be used also to stimulate the flagging circulation in this condition. A saturated solution of camphor in sterile oil given hypodermically is a quickly acting stimulant. In this type of heart attack alcohol is contraindicated absolutely.

BROKEN COMPENSATION

Rest in bed, in a bedroom that is attractive, with fresh air and sunlight is of great importance. In patients over 50 it may be a question as to whether some exercise should not be advised. The patient should be individualized and proper measures taken to give mental and physical rest, to prevent excitement, worry and melancholia.

DIET

The diet should be adequate but not profuse nor deficient. Large quantities of fluids cause discomfort. The diet should be sufficiently varied to encourage appetite. In case there is dropsy or any accumulation of fluid, the intake of fluids may be greatly restricted and only a moderate quantity of salt should be included in the diet.

ELIMINATION

The elimination of the patient should be encouraged but should not be drastic. Hot sponge baths and warm

alcohol rubs may be given and accompanied by gentle massage. Diuretics generally act unsatisfactorily in cardiac conditions. If the secretion of urine suddenly becomes small, the diet should be quickly reduced and the elimination through the skin watchfully encouraged. The bowels should move satisfactorily daily. Active watery purgings are rarely advisable and simple vegetable laxatives are usually sufficient.

MEDICAL TREATMENT WITH CARDIAC STIMULANTS

Digitalis or some of its preparations is the drug of chief reliance in this condition, dependent, of course, on the amount of good heart muscle available for it to act on. It is advisable to use a tincture of known character beginning with a moderate dose, perhaps 5 minims in eight hours and increasing a few days later to ten drops once in twelve hours and later to fifteen or twenty drops once a day. The action is cumulative and the drug should not be continued longer than five or six days without intermission. Strophanthus may be used as an alternating drug. A number of special preparations of digitalis are described in New and Nonofficial Remedies. Digitalis or its preparations should not be used when there is a fatty degeneration of the heart; it should ordinarily not be used if there is arteriosclerosis or coronary disease. The signs of overaction of digitalis are nausea, vomiting, a diminished amount of urine, occipital headache or coldness of the hands and feet. The pulse may be reduced to sixty or less a minute.

In such instances the drug should be stopped immediately, saline laxatives may be given and hot sponge baths, and perhaps alcohol or nitroglycerin.

Strophanthus is a drug of little value in restoring compensation but it acts quickly and its power of stimulating the heart and contracting the blood vessels lasts a long time.

Caffein, given as coffee or citrated caffein, $1\frac{1}{2}$ grains two or three times early in the day acts as a stimulant to the heart, increasing its activity. It is contraindicated in the presence of good compensation. It is a cerebral stimulant. Strychnin promotes muscular activity and is a general nervous stimu-

lant. It may be indicated when the heart is acting sluggishly and digitalis is not accomplishing what it was intended for.

Other drugs are to be used as indicated in various complications which may be met.

CONVALESCENCE

When compensation has been restored, the patient may be allowed gradually to resume his usual habits and work, provided that these habits are sensible, and that the work is not one requiring severe muscular exertion. Careful rules and regulations must be laid down for him, depending on his age and the condition of his arteries, kidneys and heart muscle. It should be remembered that a patient over 40, who has had broken compensation, is always in more danger of a recurrence of this weakness than one who is younger, as after 40 the blood-pressure normally increases in all persons, and this normal increase may be just too much for a compensating heart which is overcoming all of the handicap that it can withstand. Such patients, then, should be more carefully restricted in their habits of life, and also should have longer and more frequent periods of rest.

The avoidance of all sudden exertion in any instance in which compensation has just been restored is too important not to be frequently repeated. The child must be prevented from hard playing, even running with other children, to say nothing of bicycle riding, tennis playing, baseball, football, rowing, etc. The older boy and girl may need to be restricted in their athletic pleasures, and dancing should often be prohibited. Young adults may generally, little by little, assume most of their ordinary habits of life; but carrying heavy weights up-stairs, going up more than one flight of stairs rapidly, hastening or running on the street for any purpose, and exertion, especially after eating a large meal, must all be prohibited. Graded physical exercise or athletic work, however, is essential for the patients' future health, the first walking and later more energetic exercise may be advisable.

These patients must not become chilled, as they are likely to catch cold, and a cold with them must not

be neglected, as coughing or lung congestions are always more serious in valvular disease. Their feet and hands, which are often cold, should be properly clothed to keep them warm. Chilling of the extremities drives the blood to the interior of the body, increases congestion there, and by peripheral contraction raises the general blood-pressure. A weak heart generally needs the blood-pressure strengthened, but a compensating heart rarely needs an increase in peripheral blood-pressure, and any great increase from any reason is a disadvantage to such a heart. The patient should sleep in a well-ventilated room, but should not suffer the severe exposures that are advocated for pulmonary tuberculosis, as severe chilling of the body must absolutely be avoided.

The peripheral circulation is improved, the skin is kept healthy, the general circulation is equalized, and the heart is relieved by a proper frequency of warm baths. Cold baths are generally inadvisable, whether the plunge, shower or sponging; very hot baths are inadvisable on account of causing a great deal of faintness; while warm baths are not stimulating and are sedative. The Turkish and Russian bath should be prohibited. They are never advisable in cardiac disease. With kidney insufficiency, body hot-air treatment (body-baking), carefully supervised, may greatly benefit a patient who has no dilatation of the heart and who has no serious broken compensation. Surf-bathing and, generally, sea-bathing and lake-bathing are not advisable. The artificial sea-salt baths and carbon dioxid baths may do some good, but they do not lower the general blood-pressure so surely as has been advocated, and probably no great advantage is apt to be derived from such baths. If a patient cannot properly exercise, massage should be given him intermittently.

Any systemic need should be supplied. If the patient is anemic, he should receive iron. If he has no appetite, he should be encouraged by bitter tonics. If sleep does not come naturally, it must be induced by such means as do not injure the heart.

Perhaps there is no better place in this series on diseases of the heart to discuss the diet in general and

the resort treatment than at this point, as the question is one of moment after convalescence from a broken compensation, at which time every means must be inaugurated to establish a reserve heart strength to overcome the daily emergencies of life.

ANGINA PECTORIS

Angina pectoris is a name applied to the condition manifested by pain in the heart region due to the heart itself.

The pain of true angina pectoris generally starts in the region of the heart, radiates up around the left chest, into the shoulder, and often down the left arm. Such a patient is likely to assume a characteristic posture. He stops still wherever he is, stands perfectly erect or bends his body backward, raises his chin, supports himself with one hand and places the other over the heart. The duration of the attack is usually but a few seconds but the patient may die in the first or any subsequent attack.

For treatment of the immediate pain, anything may be given that quickly relieves local or general arterial spasm and spasm of the muscles. The moment that the heart and its arterioles relax, the attack is often over. The most quickly acting drug for this purpose is amyl nitrite, inhaled. If amyl nitrite is not at hand, or has been found previously to cause considerable disturbance of the head or a feeling of prolonged faintness, nitroglycerin is the next most rapidly acting drug. It may be given hypodermatically, or a tablet may be dissolved on the tongue. The amyl nitrite should be in the emergency case of every physician in the form of ampules, or may be carried by the patient after he has had one or more attacks. The ampules now come made of very thin glass with an absorbent and silk covering ready for crushing with the fingers, and are thus immediately ready for inhalation. One of these is generally all that it is necessary to use at any one time. Nitroglycerin, if given hypodermatically, should be in dose of 1/100 grain. If given by mouth the dose should be the same, repeated in ten minutes if the pain has not stopped.

Almost coincidently with the administration of nitroglycerin or the amyl nitrite a hypodermatic injection of $\frac{1}{8}$ or $\frac{1}{6}$ grain of morphin sulphate should be given without atropin, as full relaxation is desired without any stimulation of atropin.

If a patient is home and at rest at the time of an attack, a hot-water bag but slightly filled, or a pad electrically heated may be placed over the heart sometimes with marked advantage and relief from pain. Occasionally even such gentle applications are not tolerated.

After the attack is over absolute rest for some hours, at least, is positively necessary. If the attack was severe, the patient should rest several days, as there seems to be a great tendency for such attacks to come in groups, the cause being acutely present for at least some time. But little food should be given; nothing very hot or very cold, and no large amount of liquids; gentle catharsis may be induced on the following day, if deemed advisable; no stimulating drugs should be administered, and nothing that would raise the blood-pressure.

The question often arises as to whether the patient shall be told of the seriousness of his condition. It is hardly wise to withhold this knowledge from him, and generally is not necessary. The ordinary alert patient knows how serious the condition is by his own feelings, and will even reprove or joke with his physician for minimizing the danger. It is best that the whole subject be discussed carefully with him and his life regulated and ordered, and emergency drugs prepared and given him with proper instructions to the family, so that he may possibly prevent other attacks, and, if they occur, may have the best immediate treatment.

The acute symptoms being over, a careful analysis of the probable cause of the anginal attack should be made. If it is a general sclerosis, the treatment should be directed to that condition. If it is a myocarditis, a fatty degeneration of the heart or a fatty heart, this should be properly treated as previously described. If it is due to a toxemia from intestinal disturbance, that may readily be remedied. If due to nicotin, it

need not again occur from that reason, and perhaps the damage caused by the nicotin may be removed. Any organic kidney trouble must, of course, be managed according to its seriousness, and if there is hypertension without any serious lesion, the treatment should be directed toward its relief.

AURICULAR FIBRILLATION

While auricular fibrillation is a clinical entity, it is often difficult of diagnosis, and sometimes can be excluded only by treatment and the results of treatment, or by watching the patient for some time. When completely present, it consists really of a paralysis of the auricles; normal systolic contractions of the auricles do not occur, although there are little rapid twitchings of different muscle fibers of the auricles, which give the name to the condition.

The irregular pulse in auricular fibrillation is more or less distinctive, being generally rapid, from 110 upward. Occasionally the pulse-rate may be much slower, if the heart is under the influence of digitalis. The irregularity of the pulse in this condition is excessive; the rate, strength and apparent intermittency during a half minute may not at all represent the condition in the next half minute, or in the next several minutes. It has been thought that auricular fibrillation, while prevented many times by digitalis, is perhaps incurable. This is probably not true in the early stages of the condition. If digitalis does not cure the irregularity, the condition has been termed the "absolutely irregular heart." Other terms applied to the condition have been "ventricular rhythm," "nodal rhythm" and "rhythm of auricular paralysis." The condition of the pulse has been Latinized as *pulsus irregularis perpetuus*.

While the condition is best diagnosed by tracings taken simultaneously of the heart, jugular and radial, still the jugular tracing is almost conclusive in the absence of the auricular systolic wave. The radial tracing is exceedingly suggestive, and if it is taken with a careful stethoscoping of the heart, an almost certain presumptive diagnosis may be made.

OCCURRENCE

This condition of auricular fibrillation occurs occasionally in valvular disease, and perhaps most frequently in mitral stenosis; but it can occur without valvular lesions, and with any valvular lesion. If it occurs in younger patients, valvular disease is likely to be a cause; if in older patients, sclerosis or myocardial degeneration is generally present.

It may also follow depressing infections such as diphtheria, or some infection that has caused a myocarditis. Rarely this fibrillation may be caused by some of the drugs used to stimulate the heart.

It is astonishing how few symptoms may be present with auricular fibrillation and an absolutely irregular heart action. The patient may be able to perform all of his duties, however strenuous, until coincident, concomitant or causative ventricular weakening and dilatation or broken compensation occurs, and then the symptoms are those due to the cardiac failure. Often in the first stage of this weakening and later fibrillation of the auricles the patient may recognize the cardiac irregularity and disturbances. Generally, however, he soon becomes accustomed to the sensations, and, unless he has cardiac pains or dyspnea, he becomes oblivious to the irregularity. At other times he may be conscious of irregular, strong throbs or pulsations of the heart, as such hearts often give an occasional extra sturdy ventricular contraction. These he notes. Real attacks of tachycardia may be superimposed on the condition. Sooner or later, however, if the condition is not stopped, cardiac weakness and loss of compensation, with all the usual symptoms, occur. It seems to be probable that more than half of all cases of heart failure are due to auricular fibrillation, or at least are aggravated by it.

TREATMENT

The condition may be stopped by relieving the heart and circulation of all possible toxins and irritants, and by the administration of digitalis. One attack is frequently followed by others, perhaps of longer duration. Occasionally, however, the patient may be observed for many years without the condition again

being present. If the pulse, in spite of treatment, is permanently irregular, and auricular insufficiency is permanent, the patient is of course in danger of cardiac failure; but still he may live for years and die of some other cause than heart failure. The prognosis seems to be better when the pulse is not rapid—below a hundred. This shows that the ventricles are not much excited and do not tend to wear themselves out.

Any treatment that lowers the heart-rate is of advantage, such as the stopping of tea and coffee, the administration of digitalis, and an increased amount of rest and quiet. Digitalis should be increased gradually until a fair dose is given, and it is better to administer one dose a day than several. If it causes undesired symptoms, such as cardiac pain, a tight feeling in the chest, nausea or vomiting, or a diminished amount of urine, it is not acting well and should be stopped. If the pulse is gradually slowed to about what is normal, its action should be considered successful.

If the pulse is intermittent and there is apparently a heart-block, Stokes-Adams disease should be considered as possibly present, and digitalis would be contraindicated and would do harm.

A scientific indication as to whether a heart is disturbed through the action of the vagi nerves or whether the disturbance is due to muscle degeneration may be obtained by the administration of atropin. Talley (*Amer. Jour Med. Sci.*, Oct., 1912) of Philadelphia shows the diagnostic value of this drug. It is a familiar physiologic fact that stimulation of the vagi slows the heart or even stops it. Stimulation of these nerves by the electric current, however, does not destroy the irritability of the heart; indeed, the heart may act by local stimulation after it has been stopped by pneumogastric stimulation. It is also a well-known fact that anything that inhibits or removes vagus control of the heart allows the heart to become more rapid since these nerves act as a governor to the heart's contractions. Under the influence of atropin the heart-rate is increased by paralysis of the vagi. Talley states that a hypodermic injection of from 1/50 to 1/25 grain of atropin produces the same paralytic and rapid heart effect in man. He advises the use of 1/25 grain of

atropin in robust males, and 1/50 grain in females and in less robust males, and he has seen no serious trouble occur from such injections. The throat is of course dry, and the eyesight interfered with for a day or more, but Talley has not seen even insomnia occur, to say nothing of nervous excitation or delirium. Theoretically, however, before such atropin dosage, an idiosyncrasy against belladonna should be determined.

The value of such an injection rests on the fact that atropin thus injected will increase the normal heart from thirty to forty beats a minute, and Talley believes that if the heart-beat is increased only twenty or less, if the patient has not been suffering from an exhausting disease, it shows "a degenerative process in the cardiac tissue which makes the outlook for improvement under treatment unpromising." He also believes that when the heart in auricular fibrillation is increased the normal amount or more than normal, the progress is good. He still further advises in auricular fibrillation an injection of atropin before digitalis has been administered, and another after digitalis is thoroughly acting. Comparison of the findings after these two injections will determine which factor, vagal or cardiac tissue, is the greater in the condition present. The patients with a large cardiac factor are the ones who may be more improved by the digitalis treatment than those in whom the fibrillation is caused by vagus disturbance.

HEART BLOCK

Complete heart block is due to pathologic changes affecting the system of fibers whose function it is to convey from the auricles the stimulus which causes normal ventricular contraction. Gummas, calcified plaques, or tumors may press on or invade that part of the auriculoventricular conducting system known as the bundle of His. Fibrosis, fatty degeneration, infarcts and inflammatory changes occurring in the bundle of His and perhaps other portions of the conducting system may also produce heart block. Incomplete heart block, in which the relation of auricular to ventricular rhythm is partially retained, may be due to less extensive changes in the auriculoventricular

system, resulting from acute infections such as pneumonia, diphtheria, rheumatism, typhoid fever or sepsis; from lesions of the medulla oblongata or vagus, and from overdosage with digitalis. It is probable that many deaths in acute infections are due to some form of heart block, and are caused by inflammatory swelling of the fibers of the auriculoventricular system.

Patients with heart block may present no symptoms except slow pulse and independent rhythm of auricles and ventricles. This difference in rhythm is determined by comparing the number of pulsations of the jugular veins per minute, as observed in the neck, with the radial pulse or the ventricular beat as made out at the heart. Syncopal attacks, completing the picture of the Adams-Stokes syndrome, may occur at the onset of complete heart block or at any time after this condition has become established.

If during a syncopal attack, the ventricles remain inactive for from fifteen to twenty seconds, muscular twitchings simulating an epileptiform seizure occur. If the ventricles are inactive for much longer than twenty seconds, death generally results. In some cases of complete heart block in which the ventricles beat with their own slow rhythm, independently of the auricles, the syncopal attacks may be absent for many years.

Antisyphilitic treatment will greatly improve or cure those cases of heart block which are syphilitic in origin, in which the conducting system has not been completely destroyed. A Wassermann test should, therefore, always be made. In cases due to other causes, drug treatment offers relatively little. Digitalis, since it tends to slow still further the ventricular rate, should be withheld except in cases of long standing which have become decompensated owing to myocardial disease. Atropin may be used in the attack, but many who have given special study to the action of drugs in these cases question its value. Rest is important, especially in the cases occurring during acute infections.

DISTURBANCES OF THE BLOOD AND BLOOD-MAKING ORGANS

ANEMIA

In the conditions characterized by a reduction of the oxidizing power of the blood we distinguish two principal varieties. In one of these the corpuscles are only moderately affected, but are less efficient oxidizing agents because they contain a deficient amount of hemoglobin. The number of red cells is only moderately reduced, but the functional power of each cell is far below the normal. The blood when examined by laboratory methods is found to have a low color index. To determine this it is necessary to estimate the number of red corpuscles in a cubic millimeter. This figure is then compared with 5,000,000, the average number of red corpuscles in a cubic millimeter of blood of a normal person, the result representing the percentage of corpuscle. This percentage is made the denominator and the percentage of hemoglobin the numerator and the resulting fraction is the color index.

In chlorosis and secondary anemias the color index is low; in pernicious anemia the color index is high although the total amount of hemoglobin is much reduced. In pernicious anemia many corpuscles have been destroyed but the individual corpuscle carries more than the average charge of hemoglobin. Having fixed the type of anemia it is necessary to search for any etiologic factor which may favor the reduction of the corpuscles or make them poor in hemoglobin. Any loss of blood if often repeated or habitual is likely to lead to a chlorosis or may so act on the blood-making organs as to transform the type of the disease into the pernicious form. Care should be taken to exclude wasting of cachectic diseases which frequently lead to secondary anemias which may be incurable until the primary affection is removed. Intestinal worms, particularly hookworm and *bothriocephalus latus* frequently cause anemia partly by the repeated drawing

of blood, and partly by the toxins produced by the worm and absorbed into the bloodstream. Other poisons, either extraneous or autogenous, may produce a like effect.

The first step in treatment after removing any discoverable cause is to place the patient under the best hygienic conditions and afford as nourishing diet as possible.

In combating the anemia, of greatest importance is the improvement of the hygienic condition of the patient, fresh air, sunlight, moderate exercise, and deep inhalation to increase the absorption of oxygen and the carbon dioxid elimination. The diet should be based on the intestinal condition, being the most nutritious and of the kind that can best be digested. The constipation should, of course, be combated, and most important of all, gastro-intestinal fermentation and intoxication, as evidenced by the finding of indican and sulphates in the urine, should be prevented. Various hydrotherapeutic measures, electrotherapy; electric light baths, massage and vibratory treatments may be of advantage. There can be no question of the advantages of fresh air and sunlight to patients suffering from anemia, and there could be no better treatment than the open-air sanatorium treatment advocated for tuberculosis for these anemic patients. Patients who can not take the rest, sunshine and fresh-air cure improve with iron, and they will improve as much with an inorganic iron as with any organic iron. The mistake has been that too much iron is administered, hence some peptonate or albuminate or other organic iron has been said to be better tolerated. The mistake has been that the dose of the inorganic iron was not small enough. Very little is needed to satisfy the economy for iron. A small dose of the tincture of the chlorid of iron, or the reduced iron in tablet or capsule, or the pill of the carbonate of iron (Blaud), or the saccharated oxid of iron present a variety of inorganic irons sufficient to meet any indication. The multitude of other iron preparations is not needed and is superfluous.

DETAILS OF TREATMENT IN CHLOROSIS

In chlorosis, so generally accompanied as it is with amenorrhea, thyroid substance may be given in small doses, as:

| | | |
|----------------------------|-----|------------|
| | gm. | |
| ℞ Glandularum thyroidearum | 3 | or gr. xlv |
| siccarum | | |

Fac capsulas 20 (dry).

Sig.: One capsule, three times a day, after meals.

Or:

| | | |
|----------------------------|-----|----------------|
| | gm. | |
| ℞ Glandularum thyroidearum | 2 | or āā, gr. xxx |
| siccarum | | |
| Ferri reducti | 2 | |

M. et fac capsulas 20 (dry).

Sig.: One capsule, three times a day, after meals.

Occasionally cases of chlorosis resist iron and improve only after they have been kept in bed for a number of weeks. In some of these recovery is hastened by arsenic used as directed for pernicious anemia.

In convalescence from chlorosis iron should be continued in small doses for from three to six months.

Iron may be given as follows:

| | | |
|--------------------------------|--------|----------|
| | c.c. | |
| ℞ Tincture ferri chloridi..... | 5 | fl̄iss |
| Syrupi acidi citrici | 25 | or fl̄i |
| Aquæ | ad 100 | ad fl̄iv |

M. et Sig.: A teaspoonful, in water, three times a day, after meals.

Or:

| | | |
|-----------------------|-----|------------|
| | gm. | |
| ℞ Ferri reducti | 2 | or gr. xxx |

Fac capsulas 20 (dry).

Sig.: One capsule, three times a day, after meals.

Or:

℞ Pilulas ferri carbonatis. (Blaud) No. 20.

Sig.: One pill, three times a day, after meals.

Or:

| | | |
|------------------------------|-----|-----------|
| | gm. | |
| ℞ Strychninæ sulphatis | 1/2 | gr. 1/3 |
| Ferri reducti | 1 | or gr. xv |
| Quininæ sulphatis | 2 | gr. xxx |

M. et fac capsulas 20 (dry).

Sig.: One capsule, three times a day, after meals.

Or:

| | | |
|------------------------------|-----|----------------|
| | gm. | |
| R Arseni trioxidi | 02 | |
| Strychninæ sulphatis | 02 | or āā, gr. 1/3 |
| Ferri reducti | 1 | gr. xv |
| Quininæ sulphatis | 2 | gr. xxx |
| M. et fac capsulas 20 (dry). | | |

Sig.: One capsule, three times a day, after meals.

Or:

| | | |
|------------------------|-----|-----------|
| | gm. | |
| R Ferri reducti | 1 | or gr. xv |
| Salicini | 10 | 3 iiss |
| M. et fac konseal. 20. | | |

Sig.: One wafer three times a day, before meals.

PERNICIOUS ANEMIA

The treatment of pernicious anemia must be conducted on the same principles as govern simple anemia except that it is generally recognized that iron is practically useless in this form of the disease. Hirschfeld says that it is generally possible to find some preparation of iron that the patient can take, but arsenic is useful when the number of blood corpuscles is much below normal and there is little response to iron. 'Milk contains extremely little iron, so it need not be forced on the anemic as is often done. Small amounts of alcohol have a stimulating action on some anemic patients while others are unable to stand it. There is no deficiency in iron in pernicious anemia, but with repeated courses of arsenic it is possible sometimes to keep patients in good condition for years, even sometimes retaining their earning capacity. The patient should be kept under constant supervision so that the arsenic can be promptly resumed at the first signs of a relapse; iron may then prove useful also when the arsenic fails. In pernicious anemia, hydrochloric acid and pepsin must be given persistently. Transfusion of blood has sometimes done service but never realized a cure.

In a considerable number of cases reported within the last two years splenectomy has been followed by immediate improvement and in some cases by such permanent results as to lead clinicians to adopt it as a measure of much promise. The results, however, do

not indicate a cure of the disease as the blood picture still shows the characteristics of pernicious anemia.

In giving arsenic for this disease Cabot advises to begin with a dose of two minims of Fowler's solution, liquor potassii arsenitis, well diluted, three times a day and gradually increase until the patient is taking 15 minims three times daily. The drug may be given in pill form commencing with 0.6 mg. (1/100 grain) and increasing according to the patient's tolerance. When symptoms of intolerance appear the medicine should be suspended until the symptoms disappear when the treatment should be resumed. In Cabot's experience atoxyl, sodium cacodylate, and similar preparations present no advantage over the ordinary forms of arsenic. Cabot has in some cases given laxatives in doses just sufficient to produce two or three loose movements daily. He has not determined whether the good results are to be interpreted as instances of *post hoc* or *propter hoc*.

In large doses, the Roentgen rays have a destructive action on the bone marrow, but in small doses they merely stimulate it to better functioning. This at least is what Vaquez and Aubertin conclude from the favorable results of Roentgen exposures in a case of severe anemia probably the result of long, mild carbon monoxid poisoning. In several cases cited it was demonstrated that benefit may be expected when the blood marrow is still capable of responding to the stimulation. When it has degenerated beyond this, nothing can be hoped from the treatment. The outlook can be determined by examining the blood repeatedly during the course of exposures. If the numbers of nucleated cells increase, improvement may be counted on, but if the number of nucleated cells does not vary, the prognosis is grave. The radiotherapy seems to act in the same way as arsenic. In cases of mild anemia other measures seem to deserve the preference, although Grego has reported excellent results in two cases of neurasthenia with chloro-anemia given 2.5 H units at three-day intervals for three weeks. Similar benefit was realized in a case of anemia from excessive loss of blood. With these small doses the red cells and hemoglobin percentage increased without any

drop in the number of whites. Vaquez and Aubertin applied the rays with the same technic as for myeloid leukemia, especially to the knees, shoulders and elbows, and occasionally, the sternum. The rays are filtered through 2 or 4 mm. of aluminum. In one case the first dose was too large (18 H units scattered over the different epiphyses of the long bones), and the immediate result was a temporary aggravation of the anemia.

LEUKEMIA

This mysterious disease, whose cause is not yet accurately determined, is characterized by persisting increases in the white blood corpuscles. Two forms are known, the splenomyelogenous, in which there is enlargement of the spleen and tenderness over the long bones and sternum, and perhaps enlargement of the lymph glands, and the lymphatic type, in which the enlargement of the lymph glands is of greatest significance, the spleen increase being of secondary importance.

In the splenic type there is a large increase in myelocytes. The white corpuscles as a whole are increased usually exceeding 150,000 per cubic centimeter. The polynuclear forms are greatly increased and eosinophils and mast cells appear in much greater number than normally.

In the lymphatic type, the number of lymphocytes is greatly increased, forming 80 to 90 per cent. of the whole. In some cases the total number of white cells is not increased, but the proportion of lymphocytes is much greater than normally.

The onset of the disease is insidious, among early symptoms being the splenic hypertrophy, enlargement of the superficial lymph glands, pallor, anemia and dyspnea. Local hemorrhages may appear externally or there may be hemorrhages of the internal organs. An irregular temperature with periods of pyrexia is not unusual. Gastro-intestinal upsets with nausea, vomiting and diarrhea also occur. In the acute forms of the disease death may occur in from four to six weeks.

Hahn (*Therap. Monatsh.*, August, 1914, p. 452) believes that a vigorous course of treatment is not

indicated as a rule unless there is progressing anemia, distressing leukemia tumors or the whites are increasing beyond measure. The reason for holding back with energetic treatment is on account of the acute, almost explosive, aggravation of the condition which has occurred in many cases when all seemed to be going exceptionally well under treatment. The relapse then may prove far worse than the original trouble for which the treatment was started.

The Roentgen rays seem to check the growth of the hyperplastic white-corpuscule-producing tissues, but overdosage may prove fatal, and too small doses may actually overstimulate these tissues: In Decastello's case of chronic myelosis the whites dropped after three mild exposures from 720,000 to 400 with 0.9 per cent. neutrophils and the patient died from hemorrhages. Schwarz has reported disastrous results from stimulation of functioning by minute doses. In this group belong the cases of leukemia developing in professional roentgenologists; Heinecke has recently compiled six cases of this kind. Hahn advises systematic exposure of every accessible gland in the lymphatic form, but with myelogenous leukemia exposure of the enlarged spleen alone answers the purpose. In rebellious cases and recurrences he has witnessed benefit from exposing the long bones of the legs between the series of other exposures. He noted a marked improvement in the symptoms and general health in 75 per cent. of his cases, while the others were not influenced (6 in 23 cases). Bécère has reported no failure in his 12 lymphatic and 93 myelogenous cases. Radio-active substances fail in about 20 per cent. of the cases, according to the literature to date. The action and effect seem to be about the same as with the Roentgen rays; the lymphatic form seems to be less amenable to the Roentgen-ray reaction and recurrence is inevitable.

Benzol is commended by some and denounced by others. It certainly should not be given with disease of the liver or kidneys, or with catarrhal intestinal trouble, and it should be suspended when the leukocytes have dropped to 20,000 or 25,000, before they have got down to normal figures. Hahn's experience

suggests the advantage of changing from one method of treatment to another; one seems to pave the way for a better utilization of another, while both can be applied with lesser dosage, possibly commencing with the Roentgen rays and continuing with benzol, not giving above 1 gm. a day of the latter. If myeloblasts appear in large numbers under Roentgen treatment he changes to thorium X and follows with a vigorous course of arsenic. When to start treatment again with recurrence is still a question. It is his practice to keep up the Roentgen exposures after subsidence of symptoms, giving every week or two a fraction of an erythem dose, and lately has been giving occasionally 0.5 or 1 gm. of benzol a day, carefully supervising the liver and kidney functioning, and resorting to vigorous measures at the first signs of any flaring up of the process. With leukemia, myelosis and lymphadenosis it is better to hold back from vigorous measures on account of the danger of exacerbation unless one's hand is forced; then arsenic should be given a trial first. With acute leukemia all treatment seems to be hopeless, but as it is not always possible to differentiate the acute form, thorium X plus a vigorous course of arsenic should be tried.

Selling (*Bull. Johns Hopkins Hosp.*, 1910, xxi, p. 33) showed that in rabbits benzol acted as an intense poison for the white cells. This fact was confirmed by many observers, but von Koranyi (*Berl. klin. Wchnschr.*, 1912, xxii, p. 1357) first used benzene in the treatment of leukemia. Since his original article over forty original reports have appeared in the literature. All observations agree that the administration of benzene produces a marked rapid reduction of leukocytes, but the permanency of the improvement is not yet established. The benzol used enterically is best given with an equal volume of olive oil in hard gelatin capsules which may be first coated with keratin and salol before administration. It seems advisable to begin with a dosage of 5 minims of benzene three or four times a day and increase over a period of four weeks up to 30 minims three times a day.

The coincident administration of drugs to overcome anemia and the gastro-intestinal upsets is of course advisable.

Surgically, removal of the spleen has been performed in these cases but with no definite promise of permanent cure.

HODGKIN'S DISEASE

The etiology of Hodgkin's disease has only recently been determined. This condition may now be defined tentatively as a non-contagious but infectious granulomatous process due to the *Bacillus Hodgkini*. Once established, there is little tendency to spontaneous recovery in this disease. Fischer (*Deutsch. Ztschr. f. Chir.*, 1901, xxiv, p. 104) was unable to find the records of a single permanent cure. In 1913 a number of observers were able to grow a pleomorphic diphtheroid organism, gram-positive, in pure culture from the tissues in this disease, and its introduction into animals resulted in establishing a series of similar changes in these animals. The disease manifests itself by a lymphangitis, perilymphangitis, and lymphadenitis. In the early stages the process is local, though an increase in the lymphoid cells of the blood is apparent. In the later stages there are definite toxemia and anemia, and still later with wide dissemination, edema, dysphagia, etc. In a complete study of this subject Bunting and Yates (*Jour. A. M. A.*, June, 1915) state that the course of the disease depends on the relative virulence of the infection. In the acute forms death may result in two to four months and in the more chronic forms life may be prolonged up to five years. One of the most characteristic features of the disease is the alternate periods of exacerbation and remission in the intensity of the process. During such remissions the treatment then in use is often given credit for the improvement.

BLOOD PICTURE

There are two types, an early and a late, showing a constant increase in the number of platelets with abnormally large forms and either a relative or absolute increase in the so-called transitional cells. In the early type the leukocytes are usually less than ten

thousand; the lymphocytes are slightly above normal. In the late type there is a leukocytosis which may reach one hundred thousand, and the lymphocytes are reduced as low as 5 per cent. The transitional type may be above 8 per cent., the neutrophils being relatively increased to a percentage of from 75 to 92.

TREATMENT

The treatment is discussed by Bunting and Yates under five heads: Where the involvement is primarily cervical, even if the tonsils appear normal, a complete pericapsular tonsillectomy is indicated. If the primary glandular involvement is extra cervical, the source of infection must be found and the suspicious lesions appropriately treated.

Excision of the cervical glands should be done as early as possible. Axillary dissections should be as extensive and as thorough as the cervical. It may be necessary to extirpate inguinal glands, as they are sometimes primarily involved. In later stages of the disease it is often difficult to make these severe dissections.

Roentgen-ray treatment has often given rise to marked improvement, although recurrences seem inevitable under this treatment alone.

It is necessary to develop the hygiene of the patient almost to perfection. Tonics may be indicated, iron and arsenic being preferable. Salvarsan has been used in these cases, but there are as yet no definite cures reported. Benzene also has been given, but with no definite promise of success.

The use of vaccines seems rational, and both encouraging and discouraging results followed the use of this method of treatment.

The patients should be examined at regular intervals, under various forms of treatment, to determine how they progress and whether they are about to develop a new exacerbation. The prognosis should always be extremely guarded.

DISTURBANBES OF THE THYROID

HYPERTHYROIDISM

The etiology of hyperthyroidism is not yet determined. The work of Rosenow, Billings and others is significant. Rosenow has isolated an anaerobic Gram positive diplobacillus which at times takes on a coccus form from about 90 per cent. of cases of exophthalmic goiter in man. He has isolated a similar organism from two thirds of the dog goiters examined. This organism was infrequently found in the thyroid glands of dogs in which there were no demonstrable pathologic changes. B. Welchii, a hemolytic staphylococcus and a nonhemolytic streptococcus were also found in some of the thyroids examined, but these may have been contaminations. There are numerous reports in the literature of cases of hyperthyroidism following acute or chronic infections such as tonsillitis, sinusitis, arthritis and salpingitis. These facts make it seem likely that hyperthyroidism, like arthritis, endocarditis and nephritis, is due to metastatic infection of the thyroid gland. Billings has reported a series of cases of exophthalmic goiter which were treated by removal of chronic foci of infection. The results in these cases were striking and apparently give clinical proof of the infectious nature of the disease.

TREATMENT

The treatment of hyperthyroidism is then based on two main factors: first, alleviation of symptoms by the methods that have been in use, and second, removal of the foci of infection which may be responsible. In the milder and incipient cases removal of the focus alone may be sufficient. Indeed, in some of the more severe cases in Billings' series this was the only therapeutic measure used as the patient refused to remain at rest even when in the hospital, and yet many patients made a complete clinical recovery. It is, however, better to have rest in bed, freedom from all

excitement, and improved general hygienic conditions for a few days before and after subjecting the patient even to such minor operations as tonsillectomy or extraction of teeth.

Rest.—In the treatment of Graves' disease some of the most important general factors are freedom from mental and physical fatigue, and from all excitement. Rest in bed is the best method of obtaining this, but this is necessary only in the more severe cases. Cessation of work, and rest at home are in many cases sufficient. Exercise should be partaken in, but with moderation, especially in those cases in which there is more or less tachycardia; otherwise, permanent injury to the heart may result. Rest in bed with an ice pack or coil over the precordium is perhaps the best treatment for the rapid heart of hyperthyroidism. The digitalis preparations have practically no effect on this type of tachycardia; indeed, digitalis poisoning may result without any slowing of the pulse.

Excitability.—For the general nervous excitability, rest in bed is again the best treatment. Bromids may be used, but are apt to increase the general debility of the patient. Opiates are contraindicated even though they always reduce thyroid secretion. If used, it should be with great caution as serious results may ensue after even small doses of any of the preparations or alkaloids of opium. About the only drugs that seem to have any beneficial effect on hyperthyroidism are the glycerophosphates of lime and soda and quinin hydrobromid. Symptoms of cinchonism may be noted when the latter is given in 0.30 gm. (5 grain) doses, but these soon disappear. The hydrobromid is much more efficacious than any of the other salts of quinin. For the extreme nervousness of acute hyperthyroidism, a continuous water bath is very beneficial and much less injurious than the bromids and opiates that would otherwise be needed.

Diet.—The diet in mild cases should consist of simple foods the variety of which need not be limited except that it is better to use meat very moderately. Tea and coffee should of course be omitted. Caffein, strychnin and other general stimulants are contraindicated as they tend to aggravate the nervous symp-

toms. In the more severe cases a meat free, soft or even liquid, diet is advisable. The diet in all cases should be moderate in amount and of a character that will keep the bowels regulated. If the diet does not do this any mild cathartics may be given as needed. In many cases of Graves' disease there is a decreased sugar tolerance and consequently there may be a glycosuria. This should be controlled by the diet.

Infective Foci.—As already stated, an important factor in the treatment of hyperthyroidism is the removal of the foci of infection. With this in mind, teeth, tonsils, sinuses, gallbladder, appendix, genital organs, etc., should all be carefully studied and then treated as necessary to clear up any infection. The importance of completely clearing up foci of infection is illustrated by the way in which symptoms persist even after partial thyroidectomy when foci of infection remain unattended to.

Serums.—S. P. Beebe of Cornell has recommended the use of a serum in the treatment of exophthalmic goiter. He states that the serum has been used in over 3,000 cases with the following results: Fifty per cent. of the patients have been cured in the sense that they are strong and able to meet all the demands made on them. Thirty per cent. of the patients treated show a very marked improvement, to such a degree that they meet all the usual demands of life without undue reaction. Under unusual physical or emotional strain they react more than normal persons do. The two symptoms which are most evident with them are a gland larger than normal, and in many cases a mild exophthalmos. Some of this group ultimately improve to a point permitting them to be called well. The remaining 20 per cent. includes those who have not been so markedly benefited, those who have been operated on, those who have not been benefited and those in whom the disease has proved fatal. The percentage of fatal cases in patients who have had serum treatment for a period of six months is very small. The serum used was prepared from the serum of Belgian hares after the animals had been injected with serum obtained from exophthalmic goiter thyroids. Lately, Dr. Beebe has stated his belief that extracts of human

thyroids, carefully prepared and administered hypodermatically, are by far the best for the human subject. By careful analysis he has come to the conclusion that any portion of the prepared protein that contains about 0.0034 of iodine represents 1 gram of the active protein. He prepares tablets of different strengths representing 1, 2, and 5 per cent. He understands that a 1 per cent. tablet means that 1 per cent. of the dried weight of the tablet is made up of the purified thyroid protein. For hypodermic use he makes various strengths standardized on the iodine basis, put up in sealed glass tubes.

Specific Preparations.—Iodine, iodids, thyroid extract and the crystalline active principles of Kendall's group described later generally aggravate the symptoms and so are contraindicated. The constituents of Kendall's Group B would be beneficial in those cases of exophthalmic goiter in which there are some of the skin changes of hypothyroidism. There are a number of preparations on the market that are derived from thyroidectomized animals which seem to be beneficial in some cases. The extract of thymus, epinephrin, and pituitary extract sometimes seem to alleviate the symptoms.

Roentgen Ray.—The Roentgen ray has been used with excellent results. It should, however, not be used indiscriminately as, if not administered by a skilled radiotherapist, serious injury may result. The effect of radium on goiter is quite similar to that of the Roentgen ray.

Surgery.—Surgery is at present the most used therapeutic agent in the treatment of hyperthyroidism. Ligation of the superior thyroid arteries and partial thyroidectomy are both of great value in alleviating symptoms. It is, however, generally recognized that relatively few cases of exophthalmic goiter are actually permanently cured by surgery. Some symptoms persist or recur, if only when the patient is fatigued or excited. Injections of boiling water, quinin and urea hydrochlorid, etc., all produce the same results as partial thyroidectomy by destroying part of the gland.

Thymus.—Some cases of exophthalmic goiter are complicated by an enlargement of the thymus. Indeed,

it seems that in certain cases in which there are quite marked symptoms with but little enlargement of the thyroid that the thymus is the cause of the disease. Matti's research and study of the literature confirm that the thymus is often directly concerned in the production of exophthalmic goiter. The monopoly hitherto enjoyed by the thyroid is at an end. The adrenals often are insufficient in this disease and epinephrin may be indicated to prepare the patient for operative treatment. The changes in the thymus in exophthalmic goiter are not to compensate for the thyroid, but are directly coordinated with and parallel to the changes in the thyroid. The thymic hyperplasia greatly increases the risk in surgical treatment of the thyroid.

The genital organs are generally either directly or indirectly involved in exophthalmic goiter, as is shown by the irregularities in menstruation that are common. The glycosuria that is sometimes present is probably due to deranged metabolism due to altered thyroid secretion, but may be due to an infection of the pancreas by an organism similar to the one effecting the thyroid.

SUMMARY

Weiland (*Therap. der Gegenw.*, 1915, lvi, No. 5), in a summary of views on the treatment of exophthalmic goiter, remarks that men trained to think surgically are apt to regard exophthalmic goiter altogether too much from a surgical standpoint, and internists view it from the internal medicine standpoint, while men who have had much experience are liable to follow the method of treatment with which they have been most successful in the past, without due regard to whether the present case fits into the frame of the former cases. He points out the necessity, with internal measures, of supplementing general treatment both physical and psychical with a diet to influence the metabolic disturbances and specific treatment of the thyroid itself. Measures in all these directions are called for usually in every case, from the mildest thyrotoxicosis to the severest type of exophthalmic goiter.

Disturbance from perverted thyroid functioning develops very insidiously as a rule. At first there are symptoms of a general nervous disturbance; the tem-

perature is normal unless there is an underlying tuberculosis. The proportion of patients restored to full earning capacity is larger under operative than under medical measures, but the latter perseveringly applied restore full earning capacity in a larger percentage than is generally realized. Still greater benefit can be realized, if roentgenotherapy is used to supplement other measures, with or without an operation. Weiland states that he has never witnessed a case in which every one of the symptoms had entirely retrogressed under surgical or medical measures, or both, but we are justified in calling the case cured when the patient feels strong and well, the heart behaves normally, and there is no further restlessness, tremor or abnormal sweating, and full earning capacity is restored.

The first thing in treatment is to ensure physical and mental repose; a few days in bed benefits, in mild cases, as much as a few weeks in the severer forms. This repose should not be disturbed by dietetic or other restrictions, but should be utilized to tranquilize the patient's mind and obtain his cooperation in the efforts for recovery. The treatment at this time should be the same as for nervous prostration or convalescence from any sickness except that sedatives may be required to overcome severe motor and psychic unrest. In the milder cases no drugs are needed. Arsenic is useful, but he never gives iron. The diarrhea or sweats disappear spontaneously as the general condition improves. For several years it has been the practice of Kiel to give sodium phosphate in every case of exophthalmic goiter, for reasons which Weiland enumerates, and it is regarded as an essential part of the treatment. It is given in daily doses of 3 or 4 gm. in a 10 per cent. solution. Digitalis is given only under the same indications and dosage as with organic disease of the heart.

The diet should be that of forced feeding, training the patient to masticate and striving to tempt his appetite, making special use of carbohydrates and fat, possibly supplemented with some pancreas preparation. It is not necessary to push the forced feeding to bring the weight up to normal. Local applications of cold and electricity may relieve the tormenting symp-

toms from vascular goiters. He has not had favorable results from organotherapy of exophthalmic goiter, but has been much impressed with the benefit from Roentgen exposures. They can be applied in all forms of exophthalmic goiter. He used hard tubes, of $3\frac{1}{2}$ ma, with 16 x as the maximal dose, fractionated at two sittings with a few days' interval, repeating this for three or four months, with two and four weeks' intervals.

If the weight and strength keep running down and the heart functioning growing worse, an operation should be recommended without delay, but otherwise not until after a thorough course of internal measures. For operative treatment, the objective symptoms form the criterion. Weiland in conclusion emphasizes that after operative treatment the patient requires medical oversight as much as after an operation for gastric ulcer.

Added to this, however, should be a statement as to the great importance of removing foci of infection and increasing individual resistance.

SIMPLE STRUMA OF THE THYROID

It is possible that the simple strumous hyperplasias of the thyroid are due to an infection similar to the one causing hyperthyroidism, but this has not been proved. The only cause for treating the colloid goiter which is causing no symptoms is to reduce the size of the gland as a goiter is unsightly. Some colloid goiters become large enough to interfere with deglutition and respiration: in such cases, of course, surgery is indicated. Iodin, iodids and thyroid extract are sometimes effective in reducing the size of the gland. E. C. Kendall's active principle of the thyroid may prove of value in some of these cases.

Removal of foci of infection may prove of value in the treatment of these goiters. If they are infectious, removal of the foci should at least stop further increase in size and also should make a change to the exophthalmic most unlikely. So, removal of foci of infection is indicated even in the simple strumous goiters.

For the strumous goiters of puberty little or no treatment is needed as they usually disappear spontaneously.

HYPOTHYROIDISM (HYPOSECRETION)

Hyposecretion of the thyroid gland, the cause of which is not yet known, is present in the following conditions, either as a cause or as an accompanying complication :

| | |
|-----------------------------|-------------------------|
| Chlorosis | Epilepsy |
| Amenorrhœa | Melancholia |
| Obesity | Slow growth in children |
| Goiter | Cretinism |
| Eczema | Adiposis dolorosa |
| Hysteria (depressant forms) | Lipomatosis |
| Vomiting of pregnancy | Myxedema |
| Eclampsia | Senility |

Typical symptoms of hypothyroidæa are best recognized and studied in the adult female. If there is absolute absence of secretion, myxedema develops. A normally diminishing secretion, such as occurs after 45 or 50 years of age, is shown by symptoms, the most evident being the addition of flesh, especially deposits of fat, a slowly increasing blood-pressure, and a gradual development of connective tissue in various parts of the body. If this secretion diminishes normally as age advances into old age, the skin begins to lose its nutrition and dries and wrinkles, with a tendency to the occurrence of eczemas.

PRINCIPAL USES OF THYROID

The *absence of menstruation*, after it has once developed, without pregnancy or acute or chronic disease, may point to a diminution of the thyroid and ovarian secretions. If the patient is anemic, iron and ovarian extract should be the treatment. If the patient is not very anemic and tends to put on weight, thyroid extract may be used in the treatment. The dose of thyroid should be small, not more than 3 grains of the dried extract once a day.

There has never been a satisfactory explanation of the condition of *chlorosis*. For some reason these patients do not metabolize the iron of their food. Large doses of iron always cure these patients. If these girls begin to menstruate normally the disease disappears, and thyroid seems to act as an efficient emmenagogue.

Infantile obesity is modified by small doses of thyroid, and if recognized early the condition may be inhibited. The disturbance in metabolism that is most frequently improved by thyroid is *obesity*. Thyroid will probably cause loss of weight in every instance provided a sufficient amount is given, but at the same time there is a great nitrogenous loss, and there is always the danger of causing disturbances due to an increased amount of thyroid in the blood, some of which may be serious. It can cause faintness and loss of strength, and a debility which may not be recovered from in a considerable length of time. If weight is being added, especially in women, after 45, small doses of thyroid may prevent it. If the fat is already present, it may take considerable dosage to reduce it. The large doses which were once used for this purpose are not justifiable, and a patient under thyroid treatment for obesity should be very carefully watched, and the administration should cease as soon as any unpleasant symptoms appear. When weight is put on in younger life, especially in women, thyroid is the most efficient treatment, and the dose required is generally not large. The value of combining such treatment with a diet free from sugar and with a diminished amount of carbohydrates, and with physical exercise, should not be overlooked. The dose of thyroid should be 0.2 gm. (3 grains), at first three times a day for a week, then twice a day for another week, and after this once a day will probably be sufficient. To be sure that the thyroid is active, 0.25 gm. (4 grains) of sodium iodid should be administered once during each twenty-four hours. The patient may not begin to lose weight for at least two weeks, and after that some weight should be lost every week, and patients may lose weight even after the treatment has been stopped. The loss of two or three pounds a week should be considered sufficient and satisfactory. If the excessive weight is hereditary, or has persisted for years, the fat will again return on cessation of the treatment, and in these patients great loss of weight will not be caused by the treatment without the necessity for more thyroid being administered than is safe.

SIGNS OF HYPOSECRETION

If undesirable fat begins to be deposited before the age of 40, unless there is a marked family tendency to such excessive weight, the thyroid is probably undersecreting. If such deposits of fat occur on the hips, over and under the clavicles, on the upper arms, around the breasts in women, with a feeling of oppression, dyspnea on exertion, and especially if menstruation has ceased, the diagnosis is absolute, that the thyroid is secreting insufficiently. If this condition just described further develops, *adiposis dolorosa* is in evidence, the only difference being that of degree and that the fatty parts are painful. The thyroid is always found to contain a large amount of connective tissue and to be subsecreting in this disease. In the rare instances of general and localized *lipomatosis* the thyroid is probably not perfectly active, although other signs of its inactivity may not be present. Thyroid will always improve the condition of the skin even if it does not inhibit the advance of the disease.

Many *eczemas* of early childhood are often incorrigible until minute doses of thyroid are administered. These are especially the type that occur around the orifices of the body, and when little fissures or cracks in the skin occur. The troublesome *eczemas* of old age often will not heal with local treatment until small doses of thyroid are added to that treatment. Sometimes the results obtained by such treatment of these patients is most satisfactory.

Hysteria of the melancholic depressant type where there is apathy, unwillingness to talk, and general depression, may be improved and cured by the administration of small doses of thyroid. The border-line between this kind of hysteria and beginning melancholia is hard to determine, but the cerebral stimulation caused by thyroid will sometimes prevent the development of insanity. Whether actual melancholic insanity is benefited by thyroid is doubtful, but it certainly is a treatment sufficiently logical to be tried in every case.

VOMITING OF PREGNANCY

There have been many suppositions as to the cause of the persistent *vomiting of pregnancy*. It is cer-

tain that if the vomiting persists the patient develops an acidosis, and this cause alone may continue the condition or actually cause death. Whether it is purely reflex or whether there is a metabolic poisoning of the system of which vomiting is a consequence, it seems certain that any method that allows the mother to metabolize her food better, and eliminate the nitrogen excretory products properly, will be of benefit to her. Whether there is often or occasionally a subsecretion of the thyroid during the early months of pregnancy when vomiting is so likely to be in evidence is not known, but many instances have been reported in which the administration of small doses of thyroid has improved such a serious condition. It is certain that the thyroid will increase the nitrogenous output in the urine. It is also certain that the thyroid should hypersecrete during pregnancy. If it does not do so it is acting abnormally, and the vomiting of pregnancy may be an indicator of such secretion.

It is certainly advisable, when a woman has given birth to one or more children who have shown sub-thyroid activity, to administer to her thyroid gland substance during her next pregnancy. Such treatment is logical, and has been successful in producing healthy children. It is inadvisable to give small doses of thyroid to a pregnant woman or if its results are unsatisfactory, small doses of iodid may be substituted, when it is decided that the patient's own thyroid is not secreting properly.

ECLAMPSIA

Many obstetricians now believe that one of the best treatments for *eclampsia* is thyroid. In instances in which it is successful the poisoning is probably a nitrogen poisoning, and eclampsia can occur without serious kidney defect. When a pregnant woman is found to have signs of subsecretion of the thyroid she certainly is in danger of eclampsia at parturition, and the previous administration of thyroid is certainly indicated. A dose of three grains a day, at least during the last month of pregnancy, is advisable. If eclampsia has developed, 1 gm. (15 grains) of thyroid should be given at once and repeated in two hours.

Epileptic attacks developing during some disturbance of menstruation, whether at the time of puberty or at the time of the menopause, and especially if repeated only at the times of the menstrual periods, just before or just after, or at the time when the menstrual period should occur and does not, shows that the cause has something to do with the thyroid. The thyroid gland hypersecretates normally at and before menstruation; if it does not do so, something in the system cannot work as perfectly physiologically. In the kind of epilepsy just described thyroid is the treatment. It should be administered in small doses, 3 to 5 grains, daily (the size of the dose depending on the symptoms of the physiologic action of the thyroid), during the interval between the periods. When the attack is expected, for a day or two before, bromid treatment may be added. If the thyroid acts unpleasantly, causing palpitation or loss of weight, it need not be given throughout the whole four weeks of the interval, but may be omitted during the first two weeks. Many instances are on record in which this kind of epilepsy has been cured by such treatment.

MYXEDEMA

More or less complete insufficiency of the thyroid in adults causes *myxedema*. This is a rare disease in men, and occurs in more than 80 per cent. of all cases in women, and mostly in those who have borne children. It would seem from such statistical facts, that the gland is inclined to excessive atrophy because it has previously been stimulated, in women, from the periodicity of its increased secretion on account of menstruation, and from its overwork during pregnancy. The treatment is thyroid; all of the symptoms disappearing. The dose should not be large, but if for any reason the treatment is rapidly pushed, the patient should be in bed lest sudden heart failure occur from the large doses of thyroid. As soon as the patient improves, the dose should be reduced; a dose of 3 grains of the dried gland substance a day is sufficient, and even this may subsequently be given but every other day, or even less frequently. Sometimes the thyroid gland of such a patient may be stimulated or

may recuperate, or perhaps a supernumerary thyroid may develop so that active thyroid medication is needed only intermittently.

In operative myxedema in which the thyroid gland has been removed totally, or so much has been removed that the secretion of the remaining portion is insufficient, or in some instances of true myxedema, in which the patient cannot live without continued thyroid treatment, transplantation or implantation of thyroid gland tissue into various organs of the body has been tried, sometimes with success. This same implantation has been tried in cretins, and there are records of success. The younger the patient, the more successful, perhaps, is the treatment, but the whole subject of such transplantation is as yet purely experimental.

CRETINISM

In cretinous children the thyroid is either absent, or, if present, contains a small amount of colloid material or is cystic, and there is almost entire absence of thyroid secretion. The curative action of thyroid in cretinism is a demonstrated fact, and the sooner the diagnosis of cretinism is made, the greater the amount of success which will attend the use of thyroid. Unfortunately, the diagnosis of cretinism can rarely be made until the child is from 6 months to a year old, and if there is not total absence of thyroid secretion, an infantile myxedema cannot be determined until the child is 2 or 3 years old. If a cretin or a patient with infantile myxedema is not treated until he is several years old the results of such treatment are much less satisfactory. The dose for an infant is not more than .065 gm. (1 grain) of the official thyroid powder, two or three times a day. If the cretin is older, the dose may be larger. Its unfavorable action is shown by increased cardiac rapidity and loss of appetite. Its favorable action is shown by a diminution of the myxedema; in other words, the puffiness of the skin becomes less, and there is an actual loss of weight. The mental powers should increase, and the hair, nails, teeth and bones should grow normally. The thyroid feeding, as soon as improvement has positively taken place, should then be slightly diminished, and a smaller dose

given daily for months and perhaps for years. If unpleasant symptoms of thyroid action occur, the thyroid should be stopped for a week and then again begun at a smaller dose.

UNCLASSIFIED USES OF THYROID

Thyroid has been used with success in some instances of hemophilia and purpura hemorrhagica, as well as in the irregular hemorrhages of the menopause.

It has been used in chronic rheumatism as well as in arthritis deformans, and has many times been successful in gouty rheumatism, especially where the attacks showed a general disturbance of metabolism, such as at one time an asthmatic attack, at another an indigestion attack, and at another a typical gouty joint attack. Small doses given for a considerable time are often successful in this kind of metabolic disturbance.

Sometimes thyroid acts as a diuretic, and it certainly is an antidote to nitrogenous poisoning in insufficient kidney action. Even uremic convulsions are sometimes kept in abeyance by the administration of thyroid. During a uremic attack the dose of thyroid should be large, as 10 grains of the dried extract three times a day. Such treatment sometimes apparently prevents convulsions and in some instances seem to aid in saving life.

Thyroid has been used in various skin diseases, sometimes with success. The indication seems to be to stimulate extra secretion of the skin. If there is an acute inflammation or hyperemia, thyroid would not be indicated. Conditions in which it has been successful are the dry chronic eczemas, sometimes in psoriasis, ichthyosis, and in some instances of scleroderma.

If not otherwise contraindicated, whenever there is excessive connective tissue development in any organ—in other words, a sclerosis or cirrhosis—a small dose of thyroid daily is of benefit. The dose should be so small that it could not cause evident signs of its physiologic activity. In many of these instances small doses of iodid, given daily for long periods, may be of as much benefit.

Some clinicians have certified to, and even proved, in certain instances, the value of thyroid in inhibiting or causing resorption of carcinomatous growths. This is especially true of uterine carcinoma. The majority of investigators, however, have not found this treatment successful.

THE ADMINISTRATION OF THYROID

Unless thyroid is administered in large doses to combat an intoxication or toxemia, as in puerperal eclampsia or uremia, a therapeutic dose should cause no evident symptoms. In other words, if thyroid is to be administered continuously for its continued physiologic effect it should give no more symptoms than does the normal thyroid secretion. Large doses may cause nausea, dizziness, and, if quickly absorbed, faintness. There is probably no direct acute poisoning from thyroid, although large amounts have been known to cause convulsions and even death from shock, *i. e.*, by the toxic effect on the heart and the enormous vasodilator effect, as has been seen in operations for Graves' disease when the thyroid has been too much manipulated and a large amount of its secretion has been squeezed into the circulation.

The treatment of acute thyroid intoxication would be the hypodermatic or intravenous use of epinephrin or other suprarenal vasopressor substance, the administration of atropin and strychnin. Possibly good treatment would be bleeding from one arm while physiologic saline was transfused into the other arm.

Contraindications.—Any symptom similar to those of exophthalmic goiter should ordinarily prohibit the use of thyroid. Also, if during the administration of thyroid excessive nervousness, sleeplessness, palpitation, and loss of weight occur, the administration should be stopped. Ordinarily a poor condition of the circulation and a soft and weak pulse should prevent its use. Serious nervous and cerebral excitation should also ordinarily prevent its use.

Official Preparation.—*Glandulæ thyroidæ siccæ*, desiccated thyroid glands, is a yellow powder prepared from the thyroid glands of sheep. It has a disagreeable, meaty smell, and is partially soluble in water.

This preparation of course contains the active principle of the thyroid gland, but its activity depends on the amount of the iodine content, and this is variable. The dose varies from 0.03 gm. ($\frac{1}{2}$ grain) to 1 gm. (15 grains), depending on the frequency and the object for which it is used. Thyroid may also be obtained in tablets which vary in size and strength.

Thyroidin is a standard preparation described in New and Nonofficial Remedies.

KENDALL'S PREPARATION

Kendall has isolated two groups of active principles from the thyroid gland the qualities and characteristics of which he summarizes as follows:

1. By an alkaline alcoholic hydrolysis, the thyroid proteins are broken into many simpler constituents. These may be separated into two groups: the acid insoluble compounds are designated Group A; those acid soluble, Group B.
2. From Group A a pure crystalline compound, containing 60 per cent. of iodine, has been isolated. It appears to be di-iodo-di-hydroxy-indol.
3. Group B contains iodine in some unknown form of combination. It is a mixture containing amino-acid complexes and a low molecular weight.
4. Administration of A produces in the dog and in the human being a rapid increase in pulse rate and vigor, and increase in metabolism and nervous irritability. This physiologic activity is produced by the compound containing iodine in all stages of purity up to and including its crystalline form.
5. Given in excess, toxic symptoms are produced. The amount of the iodine compound required to produce toxic effects is exceedingly small.
6. In exophthalmic goiter two abnormal conditions exist. First, the secreting capacity of the gland is greatly increased and, second, the reservoir capacity of the gland is greatly decreased. The iodine compound plays an important rôle in the production of the symptoms of exophthalmic goiter.
7. The constituents of Group B produce no toxic symptoms, but in cases of cretinism, myxedema and certain skin conditions, they exert physiologic activity.

ANTITHYROID PREPARATIONS

Various antithyroid preparations may be obtained. These are of course indicated when there is too much thyroid secretion. One preparation is termed "thyroidectin," and is prepared from the blood of thyroidectomized animals. It is a reddish-brown powder, and may be obtained in capsules each of which contains 5 grains. The dose is one to two capsules, three times a day.

Moebius' antithyroidin is a serum obtained from the blood of thyroidectomized animals, the dose of which is from 2 to 10 drops, three times a day.

The milk of thyroidectomized goats may be administered fresh from the animal.

DISEASES OF THE NERVOUS SYSTEM

CHOREA

Chorea, also known as chorea minor, Sydenham's disease or St. Vitus' dance, manifests itself by muscular movements, mental irritability, sleeplessness, troublesome dreams, and perhaps hallucinations. The most frequent age is from 5 to 15 years, and girls are affected three times as frequently as boys. Chorea is probably due to an infection and the frequency with which it follows inflammatory rheumatism, and chronic tonsillitis, as well as the common complication of endocarditis would seem to indicate an organism of the streptococcal series. In fact, Dick and others have been able to show that a relation does exist between focal infections with this type of organism and chorea.

TREATMENT

As will ordinarily be noted, the child with chorea is anemic, restless, illy nourished—in fact, just the type to show a low resistance to infection. The primary indication to be met, in view of this fact, and in view of the hyperirritability of the sensory-motor system, is the provision of rest. It may be well at the outset to insist on absolute rest in bed for a few days or weeks. The child should be shielded from sources of irritation such as school work, other children, a fretful mother, hard playing or even much walking. During the period of rest, massage and passive motion may be instituted to prevent too great disuse of muscles and secondary atrophy.

The diet should depend on the acuteness of the symptoms, whether fever be present and in relation to the patients appetite. A goodly quantity of a good milk may be somewhat freely given. Meat should be allowed in small quantities only and such excitants as tea, coffee and alcohol should be absolutely interdicted.

Hydrotherapeutic and physical methods are undoubtedly of great value in chorea. The warm

bath is sedative and may be given daily or every other day. When accompanied by systematic massage or graded exercises it may achieve markedly good effects.

Needless to state, such cases should be thoroughly examined and local foci of infection such as carious teeth or diseased tonsils should be promptly eliminated. Furthermore such sources of continued irritation as phimosis, otitis media, worms, or adenoids should receive adequate attention.

It has been suggested that some of these cases are stimulated by purely mental obsessions. An analysis of the mental processes with free questioning by a physician who has gained the patient's confidence may reveal such a hidden source and an adequate explanation may be of invaluable aid in clearing up the symptoms.

MEDICINAL TREATMENT

Arsenic, as Fowler's solution, has been a highly praised treatment for chorea and seems to succeed in many cases. The drug is given in small doses beginning with 2 minims, three times a day, and increasing 1 minim a day until the physiologic effect is obtained. This is manifested by a puffiness under the eyes or gastro-intestinal symptoms. If too long continued there is a possibility of arsenical neuritis.

The patient's bowels should be kept open and a fair elimination encouraged by the use of laxatives such as cascara and phenolphthalein.

If the movements become violent or severe they should be checked by the use of a hypnotic, and chloral is generally recommended for this purpose in a dosage sufficient to cause sleep—perhaps 5 grains every four hours for a child of 6 or upward.

The heart conditions should be studied and especial attention given to it during the administration of hypnotics, antipyretics or salicylates.

Anemia may be combated with iron and arsenic, and in any event after the movements have ceased and the child is convalescent, iron may be required.

Acetphenetidin and other antipyretics, as acetanilid, have been given in some cases of chorea with full success.

The rheumatic history of these cases points to the use of the salicylates in full doses. Various English observers have given as much as 90 to 120 grains a day of acetyl salicylic acid. This drug seems preferable to the salicylate of sodium. The following prescription has been recommended as a satisfactory method of administering large doses of the drug to children:

| | gm. or c.c. | |
|--------------------------------|-------------|--------|
| R. Acidi acetylsalicylici..... | 8 | 3 iiss |
| Acaciae .....q. s. | | or |
| Syrupi aurantii..... | 25 | fl§ i |
| Aquam chloroformi .....ad | 100 | fl§ iv |

M. et Sig.: A dessertspoonful, in water, every 4 hours.
[This must be well shaken.]

This dose is suitable for a child 6 to 8 years of age, but it should be increased for older children.

A patient who has recovered from an acute chorea should be given an outdoor, quiet life for several months. School work should be absolutely prohibited. If the chorea has occurred about puberty in young girls, all excitement and the strain of school life should generally be forbidden until menstruation is thoroughly and regularly established.

EPILEPSY

The clonic convulsions of epilepsy in a typical attack are sufficiently well-known and require no renewed description here. The etiology of epilepsy is unknown. There exist one class in whom the seizures are definitely related to certain traumatic lesions of the skull, brain or meninges, or to some actually demonstrable lesion in the brain. This type of case may often be relieved by operative methods. Another type of epilepsy seems definitely associated with intoxication. Of this theory there are many adherents. In fact, C. A. L. Reed has stated: "1. Epilepsy is caused by a specific infection, probably a bacillus of the gas-forming series. 2. The infection is located in the intestinal canal, probably primarily in the duodenum, always finally in the colon, and may be superficial, intrafollicular or interstitial, or may, and in certain cases probably does, involve the blood as a propagating medium. 3. The infection seems to be made effective

primarily through constipation of mechanical origin. 4. The relief of the mechanical cause of the constipation with restoration of bowel function results in the cure of epilepsy in cases in which the infection is probably superficial. 5. The principle of immunization holds good in the treatment of cases in which the infection obviously lies deeper, in all of which autogenous vaccination may well be applied as a matter of routine."

Gowers and others have stated distinctly that often there may be a hereditary tendency to epilepsy. Still other observers are convinced that a state of alcoholism, lead poisoning, or other poisoning in either parent at the time of impregnation may be a cause of epilepsy. Turner has defined as idiopathic epilepsy "a chronic disease of the brain characterized by the recurrence of seizures in which interference with consciousness is an essential feature, associated either with convulsions or transient psychical phenomena, occurring usually in persons with an hereditary neuropathic endowment and eventually leading to more or less permanent mental impairment and dementia."

TREATMENT

If the patient is in the midst of an attack measures should be instituted to prevent him from being injured by the movements which accompany the convulsion. It is important that chewing of the tongue between the teeth be prevented. If immediately after an attack the physician be consulted the patient should be permitted to rest and recuperate before any active steps are taken to secure a history or to institute treatment.

If the case be of that type in which it is likely operative treatment will be of benefit, the course is clear.

In view of the possibilities outlined by Reed it certainly may be worth while to make an analysis of the gastro-intestinal tract and to make a bacteriologic study of the flora leading to the preparation of an autogenous vaccine.

In those cases in which one fit succeeds another in rapid order and the possibility exists of a complete

loss of consciousness, passing into a coma which presages the death of the patient, the immediate administration of a large dose of chloral or bromids, or both, may be considered. As much as 20 grains of sodium bromid with 10 grains of chloral hydrate every two to three hours have been given with success. The following mixture has been recommended:

| | gm. or c.c. | |
|-------------------------|-------------|----------|
| R Chlorali hydrati..... | 5 | 3 iss |
| Sodii bromidi..... | 10 | or 3 iii |
| Elixiris aromatici..... | 50 | fl 5 ii |
| Aquam | ad 100 | fl 5 iv |

M. et Sig.: As the physician directs.

[Each teaspoonful of the above, i. e., 5 c.c., represents 0.50 gram ($7\frac{1}{2}$ grains) of bromid and 0.25 gram (4 grains) of chloral.]

In more serious forms it may be necessary to employ hypodermic injections of morphin or even chloroform inhalation to stop and prevent these terrific seizures.

GENERAL TREATMENT

The care of the epileptic patient should be organized to overcome so far as possible the source of his intoxication and to reduce the hyperirritability. The patient should have an outdoor occupation if possible, or in any event some work in which he is not too closely confined. If not adapted for outdoor work of a strenuous character, the occupation should be light. If the epileptic cannot work he should have light systematic outdoor exercise. Plenty of sleep should be insisted on. The patient should bathe frequently and the value of strengthening and sedative hydrotherapeutic methods should not be overlooked. The diet should be ordered with care to exclude coffee, tea, alcohol and other cerebral stimulants. A regular condition of the bowels may be obtained by insistence on the use of fresh vegetables and fruits and the omission of highly seasoned dishes and fat, greasy mixtures. The amount of the food taken should be in proportion to the patient's capacity to assimilate with difficulty. In general a purin free diet has been advocated and it may be best to omit meats from the

dietary and perhaps decrease in amount all fish, peas, beans, etc.

If intestinal fermentation exists the use of lactic acid bacilli, either as buttermilk or in commercial preparations may be of aid in checking it. The simultaneous administration of sugar either as such, or in the form of sweet fruits, syrups, or other preparations, is of aid in achieving the desired result.

MEDICINAL TREATMENT

If the patient has an aura preceding his attack, he may be provided with pearls of amyl nitrite as it has been found in some instances the attack may be aborted by the inhalation of this substance.

As constipation and intestinal intoxication seem to be important factors in the course of this disease, laxatives should be used as indicated by the patient's condition.

Since Laycock, more than fifty years ago, introduced the bromid treatment of epilepsy, no other drug has been found more efficient in controlling the seizures. A daily dose of from 45 to 90 grains of the sodium salt is probably adequate. It has been shown that if the sodium chlorid of the food is reduced, a smaller amount of the bromid salt is required. The bromid treatment should be continued over several years if it seems efficacious and even beyond that, although no fits occur, in order to prevent the return of the symptoms. The bromid should not be withdrawn at once, but in decreasing dosage.

Flechsigg has advised a combined opium-bromid treatment which has given good results in his own cases as well as in those of other physicians. Kellner (*Münch. med. Wchnschr.*, April, 1915) describes the method as follows: The opium is given three times daily for fifty days, beginning with 0.05 gm. of the extract of opium at a dose and increasing to a maximum of 0.29 gm. The fifty-first day the opium is stopped and bromids are given. The dosage here must be cautiously individualized and supervised, watching for signs of intolerance or bromism and slowly reducing the dose if such appear. Sudden suspension of

the bromids almost inevitably brings back the seizures. His usual dose of the bromid mixture for a strong adult is 5 gm. a day: 1 gm. in the morning and 2 at noon and again at evening. This is increased to 6 gm. in a week and to 7 gm. after another week. He never goes above this latter dose, but thinks the bromids to be taken all the rest of the life if the epilepsy has been cured by this course of treatment. Prolonged observation has shown that a certain dose can be taken indefinitely without harm.

Crotalin, a protein found in the venom of rattlesnakes, has been exploited as a cure for epilepsy. In general, experience seems to show that it is ineffective in relieving the disease, and Anderson, as well as many others, have shown that it may be exceedingly dangerous.

Strontium bromid has been highly lauded by some as being superior to sodium or potassium bromid in the treatment of epilepsy. Such observations do not seem, however, to be borne out by either adequate clinical or experimental evidence.

HEADACHES

The causes of headaches have been divided by Osborne into several large classes: toxic, circulatory, local and reflex.

TOXIC

Fever
Auto-intoxication
Intestinal
Kidney insufficiency
Liver insufficiency
Thyroid disturbance
Drugs

CIRCULATORY

Valvular disease
Venous congestion
Plethora
High tension
Arteriosclerosis
Anemia
Leukemia
Lung consolidation
Diminished aeration

LOCAL

Eye inflammations
Frontal sinusitis
Ethmoiditis
Ear inflammations
Meningitis
Exudates into the ventricles
Changes in the cerebral
vessels.

Tumors
Syphilis

REFLEX

Eye-strain
Nasal disturbances
Aural disturbances
Facial neuralgias
Uterine displacements (?)

Campbell (Abst., *Jour. A. M. A.*, Oct. 31, 1914, p. 1610) believes that the following classification will

be found a very convenient one for practical purposes: 1. Organic disease of the cephalic structures—for example, meningitis, “rheumatic” effusion into the scalp. 2. External irritation of the cephalic structures—for example, pediculi, traction on the hair. 3. Irritation in areas other than the cephalic—for example, eye-strain. 4. Circulatory disturbances in the cephalic structures, and morbid states of the blood, causing functional headache. 5. Causes not included under the previous headings—for example, mental causes, physical exercise, atmospheric conditions.

In the first three classes mentioned by Osborne, anything that removes or corrects the serious underlying condition will remove the headache of which the patient complains. It is in the fourth class, Osborne believes, that a failure of diagnosis of the cause is most frequently made, and it is this class that constitutes about 90 per cent. of all cases of headache that come to the physician. It is his belief also that 90 per cent. of this fourth class suffer from headache because of some ocular trouble.

EYE-STRAIN REFLEXES

The most constant condition caused by eye-strain is, of course, the headache. This headache may develop slowly or rapidly, may be centered in one eye, one side of the forehead or one side of the head, or may be referred to both eyes. In fact, there is no part of the head that may not ache from eye-strain. Very frequently, however, one eye is more likely to be affected than the other, as one eye is likely to be unlike the other eye and be more defective than the other eye. Astigmatism and far-sightedness, or both, are the most frequent causes of eye-strain headache. Weakness of the ocular muscles is another cause.

The pain is perhaps most frequent in the supra-orbital region, but is often in the temple, and may be frequently referred to the inner angle of the eye, especially if there is astigmatism. It perhaps occurs very frequently in this region on account of the overactivity of the superior oblique muscle which endeavors to overcome an astigmatic affection. Headaches from defective vision from any reason, and especially when

a person becomes presbyopic and has not glasses to correct it, or at least has glasses that are insufficient to correct it, are more likely to be in the occipital region. Such headaches most frequently occur in the early morning, and are discovered by the patient on awaking.

Eyes that are defective as ocular instruments are likely to be inherited, certain kinds of eyes appearing in different members of the family, the children suffering the same defect from which the parents suffered. Such children are likely to have the headaches begin at any age, but perhaps most frequently after a year or more of school work. These headaches are likely to come periodically, perhaps once a week, perhaps once in two weeks, perhaps only once a month, but with a constant tendency to become more frequent little by little. They sooner or later become a megrim, or migraine, which is typically a headache for a number of hours followed by nausea, vomiting, prostration, sleep, and recovery.

The title given to most of these headaches by the laity is "a bilious attack," and the cause is attributed to overeating, eating at night, eating indiscriminately, or is attributed to particular kinds of food, which, if the patient is old enough to decide for himself, are gradually removed from the diet, until almost every kind of food and drink is subjected to more or less suspicion. He then attributes his trouble to his liver, or finds serious fault with his stomach. If he is constipated, he lays it to that, as he finds that after free catharsis, or at least after such a length of time as a cathartic will generally act, the headache disappears. He, therefore, thinks it is due to constipation. Girls and women with these eye defects are more likely to have headache before or during menstruation, and they attribute it to that function. Others learn that they get these headaches when they are overtired mentally or physically. Some soon learn to become suspicious of their eyes on account of having the headache after theater-going, card-playing, car-riding, shopping, sewing, or reading too long, or, if they are office clerks, after an extra amount of proof-reading or of mathematical work.

After the headache habit has once been formed a neurotic element enters into it, and there is likely to be a clyclical headache, even if the eye defect has been corrected, so that a patient who has the headache habit thoroughly formed will always have them more or less, at least until the eyes become presbyopic and focusing for near objects has almost been abolished. It is also true that neurotic patients who are subject to high tension and nervous irritabilities are more likely to have headaches from slight eye defects than are more calm and less nervous individuals.

All physicians now more or less recognize recurrent headaches as due to eye-strain, but a large number do not recognize that the patient may have stomach and heart reflexes without headache, and still due to eye defect. Dizziness, gastric indigestion, even nausea and vomiting may occur without any headache whatever and still be due to eye-strain. Cold hands and feet, chilly sensations, faint feelings, palpitation, and irregular heart and pain referred to the cardiac region so as to cause the patient to believe he has heart disease, may be due to eye-strain and be corrected by correcting the eye defect.

TREATMENT

Patients with migraine are prone to become early victims of the nostrum promoter. The headache cures are as varied if not more so than the causes of this symptom. Practically all of them contain drugs of great toxicity or else consist of worthless mixtures with no appreciable effect. Recently acetylsalicylic acid (aspirin) has become the mainstay of the large group of laity who purchase headache "cures" in preference to consulting a physician that he may aid in finding the fundamental reason for their pain.

In all cases of migraine, Campbell says, treatment should consist of first a sufficiency of outdoor recreative exercise, first strengthening the muscles, if required, and stimulating the patient's interest and pride in physical accomplishments; second, a diet abundantly rich in cellulose with agar-agar added if necessary, and from which sugar is eliminated, protein given very sparingly and starch in moderation only; third,

when the above diet and abundant diluents fail to keep the bowels free, the rectum should be attended to, or, this failing of effect, a saline as above advised should be regularly employed, and finally the patients should receive three times daily, after meals, a dose of spirits of glonoin sufficient for him to feel the physiologic effect in slight headache or throbbing of head or flushing of face shortly after taking each dose, and the dose should be maintained at or slightly beneath this. Remember that to maintain this effect, the dose has often to be greatly increased, sometimes to 30 drops or more three times a day. Such a regimen has, in Campbell's hands, brought much relief to patients with a condition in which the suffering headache, severe though it often be, is of minor importance compared to the effect on the cardiovascular system and life expectancy itself.

Of those headaches due to ocular and reflex conditions, Osborne believes that nothing is more helpful than acetanilid. The dose should not be large and it is well to combine the drug with bicarbonate of sodium. While caffein adds to the toxicity of the coal-tar product, caffein has a useful action in curing a headache of the eye-strain class. If much of a dose of a coal-tar product is given, the patient should lie down for several hours, if possible. Otherwise, the cardiac depression caused by the eye reflex plus the depression caused by the coal-tar drug will produce faintness and more or less temporary debility. While acetphenetidinum (phenacetin) is perhaps a safer coal-tar drug to use, the dose must be so much larger than the acetanilid dose that the depression is about the same. With some patients antipyrin works the best. With other patients a brisk catharsis is advisable. Some find cold to the head of advantage, although with many it causes nausea. Others find hot applications satisfactory. Sometimes a hot foot-bath will change the circulation sufficiently to relieve the head congestion. Some patients are cold, and some feel hot, and the circulation on the surface of the body is likely to vary depending on the intensity of the pain or the occurrence of nausea.

Opium treatment for these headaches is undesirable. On the other hand, one is often driven by the very intensity of the condition to the limit of medicinal resources, and sometimes cardiac depression is so serious that it becomes a question of either morphin or large doses of alcohol. Patients who have these terrible megrim attacks frequently cannot well stand coal-tar products so often repeated, as, unless the dose is enormous, the result of their administration is nil. A morphin habit and an alcohol habit, to say nothing of the frequent acetanilid habit or caffein habit, may be acquired on account of eye-strain headaches.

It is hardly necessary to mention the reflex head pain that may come from a bad tooth, from an inflammation in the antrum of Highmore or the frontal sinus, or from inflammations in the ear, as these diagnoses of causes of headache should be readily excluded.

It should be remembered that frontal headache is frequently caused by syphilis.

It should also be remembered, if there is insufficient pulmonary ability, whether from tuberculosis, emphysema, pleurisy with effusion, or asthma, that this lack of proper aeration may cause headache.

At times gastric hyperacidity and uterine displacements may be reflex causes of headache, but such causes are rare.

The wearing of heavy hats and heavy masses of hair may be the cause of headaches in girls and young women, to say nothing of the pernicious spotted veil.

FOR HEADACHE

| | gm. | | |
|---------------------------|-----|----|--------|
| R Caffeinae citratae..... | 2 | or | 3 ss |
| Sodii bromidi..... | 20 | | 3 v |
| Sodii bicarbonatis..... | 10 | | |
| Acidi tartarici.....āā | 10 | | 3 iiss |
| M. et fac chartulas | 10. | | |

Sig.: One powder in half a glass of water, and repeated in six hours, if needed.

[In order that these powders may effervesce well they must be kept dry.]

Or:

| | | |
|-------------------------|-----|-----------|
| | gm. | |
| R Acetanilidi | 50 | gr. viiss |
| Caffeinae citratae..... | 25 | or gr. iv |
| Sodii bicarbonatis..... | 5 | |
| Acidi tartarici.....āā | 5 | gr. lxxv |

M. et fac chartulas 5.

Sig.: One powder, in half a glass of water, every three hours, if needed.

[In order for these powders to effervesce well they must be kept dry.]

Or:

| | | |
|-------------------------|------|------------|
| | gm. | |
| R Acetphenetidini | 1 50 | gr. xxiiss |
| Caffeinae citratae..... | 25 | or gr. iv |
| Sodii bicarbonatis..... | 5 | |
| Acidi tartarici.....āā | 5 | gr. lxxv |

M. et fac chartulas 5.

Sig.: One powder, in half a glass of water, every three hours, if needed.

[In order for these powders to effervesce well they must be kept dry.]

Or:

| | | |
|-----------------------------------|-----|----------|
| | gm. | |
| R Pulveris potassii bromidi effe- | | |
| vescentis (N. F.).....100 | | or 3 iii |

Sig.: A heaped teaspoonful, in a glass of water, when needed.

[Each such teaspoonful represents 0.60 (10 grains) of potassium bromid.]

Or:

| | | |
|-------------------------------------|-----|----------|
| | gm. | |
| R Pulveris potassii bromidi effe- | | |
| vercentis cum caffeina (N. F.)..100 | | or 3 iii |

Sig.: A heaped teaspoonful, in a glass of water, when needed.

[Each such teaspoonful represents 0.60 gram (10 grains) of potassium bromid and 0.065 gram (1 grain) of caffein.]

A STIMULANT IN CEREBRAL DEPRESSION

| | | |
|-------------------------------------|-------------|--------|
| | gm. or c.c. | |
| R Caffeinae sodio-benzoatis (N. F.) | 4 | or 3 i |
| Aquae menthae piperitae.....100 | | 3 iii |

M. Sig.: A teaspoonful, in water, every four hours, if needed.

[Caffein sodio-benzoate consists of equal parts of caffein and sodium benzoate.]

Or, to effervesce:

| | | | | |
|---|-----------------------------------|----|-----|--------|
| R | Caffeinae sodio-benzoatis (N. F.) | 2 | gm. | |
| | Sodii bicarbonatis..... | 10 | | or |
| | Acidi tartarici..... | 10 | | 3 ss |
| | | | | 3 iiss |

M. et fac chartulas 10.

Sig.: One powder, in half a glass of water, every four hours, if needed.

SCIATICA

The sciatic nerve is one of the frequent locations of nerve pain, and is perhaps more frequently the location of a neuritis or a perineuritis than any other nerve of the body. All possible causes of the condition must be sought for and found or excluded, and before a general condition, or a condition of the blood, is decided to be the cause of the neuralgia or inflammation, all local reasons should be excluded.

A frequent cause of sciatica in women is pressure on the nerve in the pelvis, either from uterine displacements, uterine enlargements, tumors or inflammation that has extended and caused pressure.

Constipation, with fecal matter remaining long in the lower bowel, is also a not infrequent cause of sciatica, and such a condition of the loaded sigmoid is a not uncommon cause of left-sided sciatic pain.

Gout and rheumatism certainly are many times the cause of sciatic neuritis.

Exposure to wet and cold, especially when the feet become wet and chilled, or sitting on cold stones, or long sitting on hard-bottomed chairs, may be the initial cause of a sciatic neuritis.

Pain in the lumbar muscles, lumbago or lumbar myalgia, is often followed by pain in one or the other, or both sciatic nerves; or both conditions may be present at once. In fact, frequently when there is no evident abdominal or pelvic excuse, a lumbago is followed by pain in a sciatic nerve. A not infrequent cause of a lumbago is too lax springs and a too comfortable bed. This is especially true when the person is of heavy weight. A stiffening of the bed springs and a straightening of the bed will often be sufficient alone to stop this kind of pain which is so frequent, and also frequently extends to the sciatic nerves.

A weakening of the plantar arch and an attempt of the person involuntarily so to step and stand as to relieve the ache in the ankles and feet will cause abnormal muscle tension, even of the thighs, and a sciatic pain can be caused from this reason, to say nothing of the frequent pain in the knees from this cause.

Uricacidemia, and even an increased acidity of the urine, with bladder irritability, is often a concomitant condition with sciatica. The sluggish circulation due to an imperfect heart action or to a varicose condition of the leg may be a predisposing cause of sciatic pain. It is hardly necessary to mention the occasional causes of sciatica, as diabetes, malaria, syphilis and hip-joint or knee-joint disease.

Often in cases of sciatica foci of infection elsewhere in the body may be found to bear some relationship to the cause of the sciatica. Carious teeth, infected tonsils, or other foci when present should be removed. The result may be a complete and permanent disappearance of the sciatic pain.

TREATMENT IN GENERAL

Consequently, before beginning any local or general treatment for sciatica, the patient should be carefully examined and any local cause found, the circulation investigated, the urine analyzed, and the intestinal digestion and activity learned. It should also be determined whether the pain is due to neuralgia, i. e., a simple irritation of the sciatic nerve, or whether there is an actual neuritis or perineuritis, which may be determined by excessive tenderness, pain on stretching the nerve (as by thoroughly extending the leg) or by a beginning anesthesia in any part of the distribution of the nerve.

It is not necessary to urge the necessity for removing local pressure, if such has been found, before it could be expected that the sciatica or the neuritis could be made better. Free elimination from a calomel, castor oil, or saline purgative, and subsequent daily free movements of the bowels is certainly a large factor in the successful treatment of sciatic trouble. The character of the diet should be determined by the condition

of the patient. If the patient needs nutrition, the most nutritive diet possible should be given, and, in fact, perhaps hyperalimentation given. On the other hand, if the patient is plethoric, has been a high liver, eating largely of proteids, especially meats, a vegetable and limited diet for a time, at least, is the best. If the circulation is impaired, it should be aided. If the circulation is good, plenty of water should be given to aid the eliminative process by the kidneys. Hot daily tub baths, a Turkish bath twice a week, or a body hot-air treatment twice a week, are all adjuvants in the treatment of sciatic inflammation that are far ahead of medicinal treatments. The body hot-air treatment is most efficacious when rheumatism is the cause of the condition, and no treatment is perhaps more successful. This is also especially true when there is kidney insufficiency. The promotion of the circulation in the skin and the increase of the excretory ability of the skin is a large factor in the benefit derived from such treatment.

Occasionally the attack of sciatica comes on suddenly, but generally it is gradual in its development, and the longer it has persisted the more difficult it is to cure; consequently, sciatica, even in mild form, should not be neglected.

It is probable that the shooting pains down the sciatic nerve, momentary perhaps in their duration, are caused by contractions of the pyriformis muscle, which compresses the sciatic nerve. It is also probable that this muscle sometimes becomes irritated and inflamed and keeps up, by its contractions, pressure on the sciatic nerve. If such pressure is more or less continuous, sciatic neuritis could be caused. This condition being surmised or suspected, local treatments aimed at relieving the spasm of this muscle should be instituted. Among such measures may be included static wave currents, mechanical vibration and sparks from a static machine locally applied to the region of the foramen through which the sciatic nerve leaves the pelvis. Also sometimes beneficial is the application of dry heat to this part, and perhaps best by the reflected heat and light of a strong electric light.

Sometimes counter-irritation along the course of the sciatic nerve by momentary localized applications of the galvanic electric current with the positive pole active, or painting along the course of the nerve with iodine, or electric light bath treatment to the whole course of the nerve, or dry cupping along the course of the nerve and repeated on successive days, will abort a beginning neuritis. In an ordinary case of sciatic neuralgia, if the cause is removed, the neuralgia will cease.

If beginning neuritis or perineuritis is suspected or diagnosed, absolute rest of the limb on a level, hard bed, with electric light applications or dry heat applications, with the administration of alkalies or salicylate, and the general management of the bowels above outlined, may still abort the inflammation.

If, on the other hand, an actual neuritis is present, there is nothing that will shorten an attack so much as a long splint from the axilla to the heel, to give permanent fixation and rest. If a splint is used for this purpose, the bandage which binds it should be removed at least once, and perhaps better twice, a day and the limb gently flexed once or twice so that the joints will not become stiffened. The length of time such a splint should be used is determined by the amount of pain and the rapidity with which the inflammation improves. No fixed rule can be established. Another method of fixing and treating a limb so affected is by long sand bags, which may be put into the oven and rendered very hot, and changed as often as they become cool. Such applications give rest to the limb and constant dry heat. If such heat is not applied, the limb should be swathed in cotton and bandages, as warmth is very essential in all cases of neuritis.

STRETCHING THE NERVE

Stretching of the nerve by operative measures has been advocated by Nannini (*Reforma Medica*, 1914, xxx, p. 813). Nannini reports a cure by this means in six cases of chronic sciatica which had long resisted all other measures. The cure was prompt and permanent and he marvels that practitioners in general do not resort oftener to this comparatively simple

procedure. The nerve must be reached by pushing the muscles out of the way, through an incision in the rear of the root of the thigh, just below the edge of the buttocks. The nerve must be freed from adhesions and isolated over a certain stretch and then the peripheral and the central ends pulled in turn, gently and continuously, without sudden jerks liable to injure the nerve. The traction should be applied under general anesthesia and in such a way that the mechanical effect can be felt the entire length of the nerve. The effect is enhanced by having the limb flexed and then stretched to the utmost by an assistant as the traction is being applied several times. There are vague pains at first for a few days and then paresthesia in the lower leg, possibly a sensation as if the leg were gone; then all symptoms fade away and by the tenth or twelfth day the patient can get up and begin to use his leg.

NERVE BLOCKING

Injections into the sheath of the nerve, so-called "nerve blocking," of various solutions has been found in some instances to be an extremely efficacious measure. Sometimes the injection of cold water or of a small dose of cocaine directly into the nerve sheath in the region of the sciatic notch will cause almost instant cessation of the pain. Alcohol too has been used for this purpose. In general the use of drugs for this purpose may result in harm and should perhaps be attempted only as a sort of last resort. Lethaus (*Deut. med. Wchnschr.*, 1914, xl, No. 38) injects 100 c.c. of a 1 per thousand solution of a mild anesthetic at the point where the sciatic nerve emerges from the great sciatic foramen, between the trochanter and the tuberosity of the ischium. The injection is made into the nerve itself when possible, but often it is merely a perineural injection. It is repeated after an interval of eight days; sometimes three or four injections are necessary to realize a complete cure. No untoward by-effects were observed in any instance in his experience. When repeated injections do not accomplish the purpose, he tries epidural injections, and has sometimes had good results. For this he

injects 10 or 20 c.c. of salt solution into the epidural sac through the sacral hiatus, the patient in the knee-elbow position. Sometimes three or four injections had to be made to cure the sciatica completely. In some cases both these measures failed, and recurrence was sometimes observed. This is not to be wondered at, he says, as persons subject to sciatica are usually those with a predisposition to nerve and joint derangement. He warns that no attempt should be made to block the nerve when the sciatica is the result of some general disease, such as malaria, influenza, nephritis, diabetes, arteriosclerosis, or lead or alcohol poisoning, also the pains liable to occur in the hysteric and neurasthenic which masquerade as sciatica but are really of central origin. Oppenheim's "psychalgias" are likewise not suitable subjects for nerve blocking. But when the above can be excluded, Lethaus advocates prompt resort to injection treatment in chronic sciatica rebellious to other measures. He does not wait longer than from four to six weeks, during which time bed rest, sweat baths, packs of the limb affected, diathermia and the usual antineuralgic and antirheumatic measures are systematically applied.

VACCINE TREATMENT

The vaccine treatment of sciatica, according to Zappfe (*Jour. A. M. A.*, Jan. 16, 1915, p. 238), has not received the attention it deserves. Little is said about it in text-books, and only gonococcus vaccine is mentioned. Greeley cites one case treated successfully with vaccine made from a throat coccus. He gave only three injections — 100 million, 200 million and 400 million, respectively, with a final precautionary dose of 800 million. These cases, Zappfe believes, open up a wide field for vaccine therapy, but in order to follow it out intelligently one must be versed in the whole subject of vaccine therapy. The cases must be selected carefully and the treatment must be given with good judgment. The source of infection, that is, the infection focus, must be determined, and usually can be found by patient, persistent search. It may be elusive, but it exists. And when found, a vaccine is easily obtained. Cases not amenable to vaccine therapy will

yield negative results; therefore, every other possible source of the sciatic pain should be investigated thoroughly before vaccine therapy is tried, and then the same principles which make for success in this form of treatment in general hold good here.

MEDICINAL TREATMENT

When the pain is intense, and especially if periodical contractions of the muscles occur (which, however, are best prevented by the long splint), injections of morphin must be given. But perhaps nothing will prevent the necessity of such injections more than the ability to give the leg perhaps, but better the whole body, hot-air treatment, which, of course, can only be done well in an institution. The amount of morphin that is needed and the frequency depends on the pain. Such frightful pain cannot be endured, and, if not stopped by other means, must be stopped by morphin.

The coal-tar analgesics are only of temporary benefit in mild cases, are never of benefit when there is severe pain, and, as the need for an analgesic is so frequent in sciatic neuritis, great debility would be caused by such repeated use of them. Ordinarily, therefore, they should not be used in sciatic neuritis.

There is no really good reason for using atropin hypodermatically in sciatic neuritis. The pain of neuritis comes from the main trunk of the nerve and is distributed more or less to all its branches. Atropin only dulls nerve pain when that pain is due to peripheral irritation. If atropin is used in conjunction with morphin it does nothing but inhibit the narcotic and quieting effects of the morphin, and more morphin is required. Also, if the dose of morphin must be repeated for severe pain, the discomfort of the patient is increased, the restlessness is increased, and the secretions are decreased by the frequent repetition of atropin.

It should be understood that a sciatic neuritis is like any other neuritis, and, therefore, will first grow worse, reach its acme, and then gradually and slowly become better, with anesthetics, pain, and more or less paralysis. The patient should be told that a long,

tedious process is before him, and that no exact time limit to the duration of the inflammation can be promised.

After the acute condition is past, massage, possibly gentle counter-irritation, faradic stimulation of the muscles, or other electric or hydrotherapeutic measures may be used to bring the leg back to normal function.

It should be again emphasized that probably the most efficient means of shortening the inflammation in the nerve and hastening recovery is by the hot-air treatment.

BACKACHE

Under this heading Lovett (*Jour. A. M. A.*, 1914, lxii, p. 1615) has included the various aches and lamenesses which are popularly attributed to kidney or uterine disease. The picture of an individual with his hand pressing on that portion of the back beneath which the kidneys are supposed to lie — by the laity — and the familiar caption “Does Your Back Ache?” is recognizable as the chief advertising slogan of a number of nostrums issued for use in kidney disturbances. In medical literature backache has been described under any of the following headings: neurasthenic spine, hysteric, irritable or railroad spine, chronic lumbago, uterine backache, static backache, relaxation of the sacro-iliac joint, sacro-iliac strain, rheumatism of the spine, chronic back-strain, etc. Spinal tuberculosis, organic nervous disease and the effects of spinal fracture are excluded from this consideration. The most important symptoms are: insistent or intermittent dragging pain in the lower part of the back, sometimes one-sided and sometimes bilateral, generally aggravated by standing or walking and often shooting down into the buttock and backs of the thighs. Lameness in bending may be present and tenderness is usually found over the lumbar region and region of the sacro-iliac joints. The patients usually like to have the small of the back supported by a cushion. Coccygodynia is not unusual. The affection may come on gradually or suddenly; it is more common in women than in men and in certain types of figure such as the kangaroo and gorilla types of

Dickens and Foster, the overfeminine type of Reynolds and cases with slight lateral curvature. The resistance of the patients is usually less than the average and the disorder is notoriously chronic. The symptoms may be slight, or severe enough to make the patient a chronic invalid. Lovett gives the fundamental anatomic facts that bear on the condition and enumerates three etiologic classes: (1) those from disease or displacement of the pelvic organs; (2) those due to traumatism; (3) those from arthritis of the spine. There are many mixed cases, however, and there is still an unclassified group for which two theories have been offered and which he proceeds to discuss: (1) the theory of static origin which has been advocated by himself and Reynolds; (2) those due to sacro-iliac strain or relaxation. The former of these he practically accepts; the sacro-iliac theory is rejected by him. As regards the effects of strain, he considers it a more general attitudinal one than one affecting the sacro-iliac joints. The diagnosis of static backache means that the surgeon must look into the cause of it and try to remove it before treatment. Pelvic backaches have some characteristics distinguishing them from those of static origin, and this favors the view that they are most often caused by the forward bent position, causing increased efforts on the part of the posterior muscles. Mixed cases are frequent. A puzzling class of cases lies between those associated with trauma and those clearly arthritic, but in many cases the latter diagnosis is not supported by the results of treatment. In many cases due to defective balance and flat-foot, inequality of the limbs, etc., are reported. Backache due to relaxed and slumped attitude is perhaps the most common type of static backache. In an analysis of eighty-three cases, twenty-nine males and fifty-four females, there were forty-one of static backache, the majority due to defects of anterior posterior balance; there were six pelvic cases, twenty traumatic and fifteen arthritic. There was one case attributed to acute lumbago. In cases from traumatism we may assume a sprain of the spinal joints or pelvis. If they are non-traumatic, defective balance may be sought for. In all cases of women the possible pelvic

cause must be borne in mind. The case must be classed as probably arthritic when it is chronic and there is marked stiffness and pain on motion. Referred pains in the legs and disturbances of sensation are suggestive. Some cases can hardly be classed, however, and a hysteric or neurasthenic spine is no diagnosis at all. The prognosis depends largely on the possibility of removing the cause. In balance cases proper treatment should succeed unless the patient is neurasthenic. Pelvic cases should go to the gynecologist, and the outlook for traumatic cases is favorable except in elderly persons or those undertaking litigation. In arthritics the treatment consists in fixation of the spine, and he prefers a canvas lacing in the back with light steel straps to plaster-of-Paris casts. Defects of balance should be carefully studied, and a correct corset should be prescribed.

Backache due to flat-foot, Graham (*Old Dominion Jour. Med. and Surg.*, October, 1914) believes, usually disappears promptly when the inner sides of the heels of the boots are elevated $\frac{1}{4}$ of an inch and the inner corners of the heels set $\frac{1}{2}$ inch farther forward than the outer corners. If this does not afford the desired relief the arches may be supported by felt pads or steel supporters. Of the two forms of support mentioned, Graham much prefers the felt instep pads to the rigid steel supports. The most common surgical cause of continued backache met with in children and occasionally encountered in adults, he says, is spinal caries or tuberculosis of the spine. When acute, as evidenced by marked muscular spasm of the back and exquisite pain, the patient should be placed on a Bradford frame with a bag of sawdust underneath the spine so as to produce a posture of hyperextension. When the acute stage has sufficiently subsided a plaster corset is applied extending from the sternal notch above to a point just sufficient to allow the patient to sit down. During the later stage of convalescence a steel brace may be worn. When ankylosis is well established and all pain has disappeared all support may be gradually omitted.

Sacro-iliac strain is relieved in the milder cases by adhesive strips which should be placed diagonally

across the lumbar region. Starting at a point just below the anterior superior spine, the strip of adhesive is carried diagonally across the back. Then one is started on the opposite side and carried across in a similar manner. The successive strips overlap each other from $\frac{1}{3}$ to $\frac{1}{2}$ of the width of the strip. Then circular bands encase the pelvis. For the chronic types of sacro-iliac strain a leather belt around the pelvis often affords perfect relief. This belt is worn tight around the pelvis in order to prevent movement in the sacro-iliac joint. In the more serious types fixation by plaster or a steel splint are indicated. For spondylitis deformans, a condition in which bony deposits are thrown out around the articular surfaces of the vertebra and on the spinous and transverse processes, producing a painful and deforming condition, a long plaster corset extending from the pelvis to the suprasternal notch offers the best hope of relief.

Lumbago is best treated by the crisscross adhesive strapping as described for sacro-iliac strain, except that it is not necessary in this condition to encircle the pelvis. Visceroptosis causes much backache which can be relieved by a corset which fits snugly around the pelvis and supports the abdominal viscera and strengthens the abdominal wall. The corset should begin to be less snug as it leaves the brim of the pelvis, and should gradually become more open from that point upward. In exceptional cases an abdominal pad or an abdominal supporter, to be worn inside the corset, is indicated. Static back, a condition indicated by weak, flabby muscles and accompanied by faulty weight bearing and pain, calls for massage, exercises and a properly adjusted corset. Scorbutic spine is best treated by recumbency on a Bradford frame, with the spine hyperextended, proper attention being given to diet and hygiene.

INTOXICATIONS

THE TREATMENT OF DRUG ADDICTIONS

The Harrison antinarcotic law, which became effective March 1, 1915, deprived many addicts of their drug and caused considerable suffering. Numerous methods have been devised to wean patients from the drug habit.

THE LAMBERT-TOWNS METHOD

The Lambert (sometimes referred to as the Lambert-Towns) method of elimination and rapid withdrawal has proved quite satisfactory. This method has been described by Dr. Alexander Lambert in *The Journal of the American Medical Association*, and is here repeated. This must not be regarded as a cure for drug habits, but is intended to obliterate the terrible craving which these patients suffer when deprived of their accustomed drug. Vigorous elimination is the most important feature of the method, and is secured by the administration of compound cathartic pills and blue mass or some other form of mercury. The other essential measure is the persistent use of the following belladonna mixture:

| | Gm. or c.c. |
|------------------------------------|-------------|
| ℞ Tincturae belladonnae (15%)..... | 62 |
| Fluidextracti xanthoxyli..... | |
| Fluidextracti hyoscamī, āā..... | 3℥ |

With these two prescriptions as a basis the following steps in the treatment are to be observed:

A patient addicted to morphin is given five compound cathartic pills and 5 grains of blue mass. Six hours later, if the bowels have not moved, a saline is given. After three or four abundant movements of the bowels (and not until then) the patient is given by mouth or hypodermically, depending on his habitual method of taking the narcotic, in three divided doses, at half-hour intervals, two-thirds or three-fourths of the total daily twenty-four-hour dose of morphin or opium to which he has been accustomed. Observe the

patient closely after the second dose, when about half the total twenty-four-hour dose has been taken. A few patients cannot comfortably take more than this amount. Six drops of the belladonna mixture dropped with a medicine dropper are given in capsules at the same time as the morphin or opium, and should be repeated every hour for six hours. At the end of six hours the dose of the mixture is increased 2 drops. This dose is then continued at hour intervals for another six hours, when the dose is increased by 2 drops, and again continued at the same interval, increasing the dose each six hours until it reaches 16 drops. It is then continued in this amount, but is diminished or discontinued at any time if the patient shows belladonna symptoms such as dilated pupils, dry throat or redness of the skin, or mental symptoms. It is begun again at reduced dosage after these symptoms have subsided. Unusual sensitiveness to belladonna will usually be manifest in six or eight hours, when the dose can be cut down 2 to 4 drops and then raised by 1 drop every six hours. On the other hand, if after twelve hours the 16 drops have not produced dryness of the throat the dose may be increased to 18 or 20 drops every hour until the dryness occurs, and then the amount may be reduced.

At the tenth hour after the initial dose of morphin five compound cathartic pills and 5 grains of blue mass should again be given. If they have not acted in six or eight hours, give some vigorous saline. When the bowels have acted vigorously, which is usually at about the eighteenth hour, give half the original dose of morphin; that is, one-half or three-eighths of the original total daily dose. The belladonna mixture is still continued, and ten hours after the second dose of morphin, five compound cathartic pills and 5 grains of blue mass are again given, if necessary, followed by a saline seven or eight hours later. After the bowels have acted thoroughly, at about the thirty-sixth hour, the third dose of morphin is given, which should be one-sixth or three-sixteenths of the original dose. This is usually the last dose of morphin. Ten hours after the third dose of morphin, the forty-sixth hour, again give the five compound cathartic pills and 5

grains of blue mass, followed seven or eight hours later by a saline. After the bowels have moved thoroughly a bilious green stool should be expected and after its appearance 2 ounces of castor oil should be given to clear out thoroughly the intestinal tract. It is sometimes found necessary to continue the belladonna mixture over one or two additional cathartic periods before giving the oil. After giving the last dose of compound cathartic pills, and before giving the oil, the patients will have their most uncomfortable time, and may be relieved by 5 grains of codein hypodermically. This should not be kept up long after the oil is given. Beginning about the thirtieth hour the patient should be given strychnin or digitalis or both every four to six hours.

Withdrawal pains can sometimes be relieved by ergot and strychnin, by massage, sodium salicylate or by some salicylic compound combined with coal tar products such as antipyrin, acetphenetidin or pyramidon. Indiscretions in eating or exercise two or three days after stopping the drug may cause a recurrence of the withdrawal pains, due to exhaustion or indigestion. This trouble will quickly disappear without narcotics.

Insomnia may be troublesome and may be treated by bromids, cloral or other hypnotic. Lambert's experience is that veronal acts badly in these cases. Muscular fatigue is the best hypnotic, and regular exercise may be carefully taken within a week after the discontinuance of the drug. It is important to build up the patients physically.

Morphin and alcohol addicts should be treated for the morphin addiction and the alcohol may be tapered off gradually. The gastritis usually found may cause difficulty in retaining medicines or food. Sodium citrate in doses of 5 to 10 grains every hour will relieve this condition, and if necessary may be supplemented by 10 to 20 grains of cerium oxalate.

Cocain and morphin addiction make a difficult combination to treat, but the procedure should be that for morphin, with plenty of strychnin or other stimulant. The cocain should be withdrawn at once. The

patients may become delirious and unmanageable after the effect of the morphin wears off.

The cocainist should be treated like the alcoholic, by withdrawing the cocain, giving the belladonna mixture every hour, increasing as with the morphin patients, and the five compound cathartic pills and 5 grains of blue mass, the first doses being taken simultaneously. At the end of the twelfth hour repeat the cathartics and the saline, and likewise at the twenty-fourth and thirty-sixth hours. After the last cathartic the bilious stools will appear, and at the forty-fourth or forty-fifth hour the castor oil is given. Unless the bilious stools appear it may be necessary to continue the treatment over one or two more cathartic periods.

Though each patient presents an individual problem, Lambert insists that the plan must be adhered to closely. The cholagogue action of the mercury is essential and the persistent repetition of the doses of the belladonna mixture so as to produce the physiologic effect is required to prevent the craving for the drug.

PETTEY'S METHOD

The method of Pettey in morphin addiction also employs active purgation as one of its principal features, with sedation in the form of scopolamin after the drug is withdrawn, with large doses of strychnin in the purgative to increase peristalsis and also afterward for its supporting effect. The steps in the treatment may be described as follows:

On the day the treatment is begun the patient may take his usual doses of the drug. He is required to abstain from dinner and supper, and at 4, 6, 8 and 10 p. m., he is given the following purgative prescription divided into four capsules:

| | |
|--|-------|
| ℞ Calomel | gr. x |
| Powdered Extract Cascara Sagrada āā... | gr. i |
| Ipecac | gr. ¼ |
| Strychnin nitrate..... | gr. ⅙ |
| Atropin sulphate..... | gr. ⅙ |

No opiate and no nourishment are to be given the following morning until the bowels have moved thoroughly. In order to insure the movement of the bowels, six or eight hours after giving the last purgative

capsule, 1/20 grain of strychnin should be given hypodermically and a half hour later 2 ounces of castor oil or a bottle of citrate of magnesia. Both the strychnin and the oil or saline should be repeated every two hours until the intestinal canal has been thoroughly emptied, and no morphin should be given during this time. The thorough elimination will afford relief from the discomfort of abstinence from the drug and this should be taken advantage of to postpone the morning dose of the narcotic. When the demand for the drug becomes insistent it may be given in not more than one-half to two-thirds the usual dose at the same intervals at which the drug was formerly taken. After the purgation liberal feeding may be allowed until within six or eight hours before the next purgative course. This should be forty-eight hours from the beginning of the first purgative course, and may be more or less active, according to the effect obtained from the first, but none of the purgative ingredients should be left out, and large doses of strychnin are insisted on. The morphin in reduced dose, sufficient to keep the patient comfortable, may be continued until the last dose of the second purgative course, when the drug is to be discontinued and no other opiate should be given. Six or eight hours after the second purgative course has been completed, strychnin hypodermically and the oil or saline should be repeated as after the first course, until free bowel movements occur. The patient will now be able to go longer before feeling the effect of abstinence from his morning dose, especially if he remains in bed, which he should do. Within six or eight hours after the time for the morning dose the patient's demand for relief from discomfort should be met by giving, instead of the opiate, 1/200 grain. scopolamin hypodermically, and this should be repeated in thirty minutes. If the patient has not fallen asleep after the second dose a third may be given in a half hour or hour, which may be of the same size or double the previous dose, depending on the effect. This will produce either sleep or mild intoxication, in either of which conditions the patient will not suffer. Immediately he awakes another dose of scopolamin, 1/200 grain, should be given, and repeated to keep up a mild

belladonna intoxication and to maintain the patient free from pain. This impression from the scopolamin should be kept up for thirty-six to forty-eight hours after beginning it, and then should be discontinued. During the scopolamin period and for twenty-four hours afterward, 20-grain doses of sodium hyposulphite may be given every two hours, which will supplement the effect of the calomel purgative and the patient will have small, bilious stools, unattended by colic or griping.

Convalescence will be reached on the fifth or sixth day and no further medication is indicated as far as the addiction is concerned and the patient will be comfortable. Deficient heart action during or after treatment may be treated by spartein sulphate in doses of 2 grains every four to six hours.

JENNINGS' TREATMENT

The treatment of Oscar Jennings consists in giving dionin in place of the morphin, accompanied by spartein sulphate, the doses of dionin being rapidly reduced as conditions warrant. Hygienic measures and good feeding are also employed with vichy, stimulants, cola and other drugs to meet indications. He lays stress on the reeducation of the patient in self-control.

THE METHOD OF SCELETH

The patient is given a preparatory dose of saline cathartic. The basis of the medical treatment is the following:

| | |
|---------------------------------------|---------------------|
| Scopolamin hydrobromid..... | gr. $\frac{1}{100}$ |
| Pilocarpin hydrobromate..... | gr. $\frac{1}{12}$ |
| Ethyl-morphin hydrochlorid—(dionin).. | gr. ss |
| Fluidextract cascara sagrada..... | ℥ xv |
| Alcohol | ℥ xxxv |
| Water | qs. ad 3 i |

The dose is varied according to the extent of the addiction. Patients vary from 1 or 2 grains to as many as 60 to 90 grains a day of morphin. When more than 10 grains of morphin per day are being taken, 60 minims of the above mixture is given every three hours day and night for six days. On the seventh day the dosage is reduced to 30 minims, the eighth to 15 min-

ims, and on the ninth 15 minims three times a day instead of every three hours day and night. On the tenth day the mixture is discontinued and strychnin nitrate, one-thirtieth grain, three times a day, is used. On the eleventh day strychnin nitrate, one-sixtieth of a grain, is given, and this is continued for a week. During the first five days only light diet is given, but patients are encouraged to take liquids freely.

If a patient is using less than 10 grains of morphin a day, the dose should be 30 minims of the mixture to begin with. If he is using less than 5 grains, 15 minims is used as a starting dose. During the first three days the patients suffer from insomnia, and in about 10 per cent. of the cases vomiting; this is to be expected. If the pulse goes below 40 or over 120, the mixture is stopped for a single dose. If there is collapse, one-half grain of ethyl morphin hydrochlorid or one-fourth grain morphin is given hypodermically. In about 4 per cent. of the cases of scopolamin delirium may develop. In such instances the mixture should be given without scopolamin for two doses, and then continue with scopolamin in one two-hundredth-grain doses.

During the treatment no other drugs should be used. After the fifth day the patients will have no further desire for morphin. Up to this time they care very little for food, but after the fifth day they develop a ravenous appetite and will gain weight rapidly. Extremely emaciated patients will gain a pound a day for the first thirty days. The patient should be directly under the physician's care, but after eleven days, the strychnin treatment of seven days may be safely entrusted to the patient.

The final results are, of course, dependent on the cause of the addiction. If, since the beginning of the habit, the cause has been removed, the patients are permanently cured and do not return to the habit. Where the cause persists, whether it be functional neurosis, a degenerate mentality or criminality, the patient occasionally returns to be treated anew. The treatment of the cause should be borne in mind at the time any corrective treatment is undertaken.

LEAD-POISONING

In communities in which there are industrial plants handling lead, poisoning from this source is frequent. It has been shown that the most poisonous or the most soluble forms of lead are not necessarily the most likely to cause accidental poisoning. Those that most readily form dust seem to be most harmful, the more the dust is abolished, therefore, in all forms of lead factories and lead industries, the less poisoning. There is no question, of course, of the danger of lead fumes from molten lead.

In an investigation of this subject Dr. Alice Hamilton (*Jour. A. M. A.*, 1912, Sept. 7, p. 777) came to the conclusion that the most poisonous of the lead salts is probably the suboxid which forms on the surface of melted lead, is given off in fumes at high temperatures and also rubs off on the hands of the leadworkers; it is this salt that causes poisoning in smelters, molders, type-setters, plumbers and others. The other forms most likely to cause poisoning are litharge or oxid of lead, and then the higher oxids of lead, as red lead, and the carbonate of lead, or white lead. Those who clean or scrape off lead paint, and also painters, are likely to have poisoning from white lead. Lead-poisoning occurs frequently in factories in which men work in white lead, and in oxid of lead or red lead, and Dr. Hamilton finds that those who work in red lead are poisoned sooner than those who work in white lead.

She believes that a weak sulphuric acid lemonade, which workmen were urged to drink, is not a protective against lead-poisoning. It has been proved that most forms of lead will be so acted on by the gastric juice during digestion that some lead will be absorbed. The only harmless lead seems to be the sulphid of lead.

The amount of lead necessary to cause poisoning varies greatly, probably according to idiosyncrasy, some persons being susceptible, others being tolerant. Some artisans, therefore, may work in lead for years without evidence of poisoning, while others can work but a few weeks before poisoning is apparent. Investigations in some of our factories, Dr. Hamilton says, showed that from 25 to 35 per cent. of the employees

had some form of lead-poisoning. Negroes seem more susceptible to lead than white men, and women are probably more susceptible than men. Fatigue, improper housing and insufficient food all render the individual more susceptible to lead-poisoning and its anemia, as we would logically conclude. Those who drink much alcohol are more susceptible to the poisoning, and the tendency to drink beer or whisky in order to remove the sickish, disagreeable, sweet taste from the mouth due to the lead salts that are inhaled or swallowed is great with men in these employments. Women, on the other hand, drink a good deal of tea, or crave sour things, to overcome this disagreeable taste.

It has not been shown that lead is positively absorbed from the skin, or that much is absorbed when inhaled into the lungs; probably most of the poisoning is caused by lead being swallowed into the stomach.

The diagnosis of chronic lead-poisoning is sometimes difficult, and for that reason every one should be questioned as to his possible exposure to lead, after other more tangible causes are excluded, if he loses appetite, is pale or anemic, is constipated and suffers from indigestion. These are all prodromal symptoms. The blue line on the gums may or may not be present. If the teeth and mouth are properly cared for the blue line is probably not often found. "The basophilic granulation of the red cells," which was thought at one time to be diagnostic of chronic lead-poisoning, has been shown not to be pathognomonic. Lead may or may not be found in the urine of patients who show other signs of lead-poisoning; therefore its absence will not exclude lead-poisoning. It has been suggested, in cases in which the patient is working in lead and poisoning is suspected, that a soluble sulphid be rubbed on the skin, on the theory that lead is excreted through the skin, and that if a black precipitate is formed, it will show that there is lead in the tissues.

Dr. Hamilton concludes that, although one attack of acute plumbism is not serious and may leave no diseased condition, one attack does predispose to another, and that probably a man who has had one attack of acute colic, for instance, or of wrist-drop, certainly

should be ordered to stop working in lead, and that the employer should refuse him employment. The later pathology of chronic lead-poisoning becomes that of cardiovascular-renal disease on the one hand, or progressive anemia, weakened muscles, especially the extensors, tremor and emaciation.

In this anemia nucleated red corpuscles are almost always found, even if the anemia is not profound.

Lead colic may occur suddenly, or after protracted constipation, with or without gastro-intestinal pains. During the paroxysm the patient generally vomits, the pulse is slowed and the blood-pressure is generally raised. Nothing will stop this kind of pain but large doses of morphin, used in combination with atropin. Hot fomentations to the abdomen should be used, or better, if the patient is able, a hot bath should be taken. As soon as the pain is less severe the patient should receive a saline cathartic, and best perhaps Rochelle salt, as, in spite of the usual innocuousness of magnesium sulphate, it should not be forgotten that, occasionally, if magnesium sulphate does not cause purging and is absorbed, it can cause nervous depression not dissimilar to that which may occur from lead.

The after-treatment of lead-poisoning of this nature, or if chronic lead-poisoning is diagnosed without lead colic occurring, is a daily morning dose of Rochelle salt or something similar and the administration of small doses of sodium iodid. The dose of iodid should, as a rule, be small, not more than 0.20 gm. (3 grains) three times a day, after meals, as large doses may cause more lead in the system to become soluble than is desired, and more acute symptoms of lead-poisoning to occur. Anything that builds up the nutrition is also good after-treatment for chronic lead-poisoning; for example, the administration of small doses of iron, and the prevention of high blood-pressure and a possible beginning cardiovascular-renal disease.

If lead palsy, which in its most frequent form is wrist-drop, is present, the tonic treatment mentioned before should be carried out with the addition of strychnin and the use of electricity and massage.

Acute cerebral symptoms not infrequently occur. These symptoms may be a delirium, convulsions, epi-

leptiform in character, or more or less coma. Occasionally hallucinations and insanity are caused by the action of lead on the brain. These conditions are all exceedingly serious. While wrist-drop is generally curable, more profound paralysis of the arms and legs is much more serious.

Prevention, of course, should be considered by every employer and should be understood by every employee who has anything to do with industries that make or handle lead. A patient who has once been poisoned by lead should either leave his occupation or should inaugurate such means of prevention of future poisoning as are efficient. Personal cleanliness is one of the greatest factors in the prevention of lead-poisoning.

DELIRIUM TREMENS

The use of alcohol, while not so general as a few years ago, is still sufficiently frequent to cause every physician to be mindful of its possible effect on every patient whom he is called to treat. In individuals who have habitually used considerable quantities of alcoholic stimulants, even although they may rarely, perhaps never have drunk to intoxication, the unfavorable effects of the chronic indulgence in alcohol are frequently seen when acute or chronic illness supervenes. Especially in the severe acute infections, like pneumonia, the symptoms are frequently modified or added to by the effects of the habitual use of alcohol.

In commencing the treatment in a case of this kind, the physician should inquire carefully, and consider the possible influence of the habitual use of alcohol on the symptoms and course of the disease.

A common characteristic of these cases is the loss of appetite, accompanied often by nausea and vomiting, so that it is difficult for the patient to retain either nourishment or medicine. If the stomach is irritable, it is necessary to give such gastric sedatives as bismuth or bicarbonate of sodium, with such aromatics as capsicum or peppermint. The stomach being in a condition to retain food, abundance of light nourishment should be administered at regular intervals. Milk may be given hot or cold according to the preference of the patient; but if he has no preference, preferably

hot. Other light foods should be given, as broths, gruels, or soups. If he is able to take solid food, easily digestible articles may be added, such as custard, eggs, lamb-chops, or beefsteak.

SEDATIVES

At the first appearance of restlessness and insomnia the patient should be given the bromid of sodium in 1-gm. (15 grain) doses, repeated every two, three, or four hours. In the evening when it is natural to desire that the patient should sleep, a more active hypnotic should be used. Chloral in a dose of 1 gm. (15 grains), and repeated in one hour, if needed, will generally prove effective in securing prolonged sleep, after which the patient's condition will frequently be found very much improved.

Although chloral is undoubtedly the peer of all hypnotic drugs, it is rated as a cardiac and circulatory depressant, and, as is well known, can cause heart failure and death. All hypnotics except morphin, however, in sufficient doses to produce sleep, are cardiac depressants, and it is quite probable that a dose of chloral which is sufficient to produce sleep in a patient with delirium tremens is no more depressant than the dose of other hypnotics sufficient to produce sleep in a patient in the same condition. If the circulation is notably weak, however, other hypnotics may be selected. Paraldehyd has had a long period of approval. Its action is rapid, and many times satisfactory. If the dose is sufficient, there may be considerable circulatory depression for a short time. The various synthetic hypnotics, old and new, sulphonmethane (sulphonal), sulphonethylmethane (trional), diethyl barbituric acid (veronal), and sodium diethylbarbiturate (veronal-sodium), all act more or less satisfactorily, but act much more slowly than do chloral or paraldehyd, and in doses that are sufficient will produce considerable later depression. A sufficient dose of scopolamin hydrobromid, hypodermatically, to cause sleep in this excited condition is also likely to cause depression. Also, there often is an increased susceptibility to any atropin or atropin-containing drug,

so that the cerebral excitation may be increased by scopolamin.

In cases of acute illness in which, on account of the history of alcoholic addiction, there is reason to believe that symptoms referable to the habitual use of alcohol are liable to supervene, the use of sedatives should be commenced early before any of the characteristic symptoms of alcoholism appear, and should be continued until it is evident that there is no danger of prolonged insomnia and restlessness.

In severe cases in which active delirium with hallucinations has supervened, energetic treatment is urgently demanded. Danger must be looked for in two or three principal directions. The circulation is threatened, owing to the weak action of the heart, which may result in edema of the lungs. At the same time the circulation in the brain is especially affected so that there is a passive congestion, with more or less edema. Added to this are the symptoms of exhaustion due to the insomnia and violent muscular agitation. Here there is urgent necessity of maintaining the nutrition of the patient by giving liquid nourishment at regular intervals. It is necessary also to watch the circulation carefully and to maintain the action of the heart. The use of alcoholic stimulants for this purpose, while still recommended by many, is of doubtful propriety at this stage of the disease.

If there is serious cerebral excitement and hypnotics in ordinary doses do not act, the best treatment is ergot, in some reliable aseptic form, injected intramuscularly into the deltoid muscle, a syringe-ful at a dose. One hour after this injection, a hypodermic injection of morphin may be given, not more than $\frac{1}{4}$ of a grain.

Theoretically morphin is not good treatment when there is cerebral excitement, as the dose required to quiet such excitement is very large, while smaller doses tend to increase the excitement. Under the condition described, however, ergot given first to relieve congestion of the brain and spinal cord and followed by morphin, prevents the initial excitement of the morphin and projects the length of time which

a given dose of morphin will act, and the outcome is satisfactory.

CEREBRAL EDEMA

If there are signs of cerebral edema, no treatment is better than, or so satisfactory as, the subcutaneous ergot treatment. The ergot may be repeated in three hours, and then once in six hours for several doses, if it is required. The administration of ergot by the mouth for the action desired on the brain is absolutely unsatisfactory and cannot be relied on. Also, if the heart is weak, ergot is the drug indicated.

In other words, if there is apparent edema of the brain, ergot; if there is cerebral excitement and the heart is efficient, chloral; if there is cerebral excitement and the chloral is unsatisfactory alone, add ergot; if there is cerebral excitement and the heart is weak, ergot and morphin.

Strychnin is inadvisable as a stimulant in this condition. Aromatic ammonia may be given if a quickly acting stimulant is required. A saturated solution of camphor in an aseptic oil may be given hypodermatically, if required, as a quickly acting stimulant. Strophanthin hypodermatically may be given, if deemed advisable. Digitalis, which does not act well for at least twenty hours, is generally not indicated.

In the meantime, while these various dietetic and medicinal measures are being employed, the patient should be kept quiet, should be constantly watched, and should be frequently bathed with warm water, or, if strong enough, given hot baths.

Kramer (*Ohio State Med. Jour.*, March, 1914) found that 1 per cent. solution of sodium bromid might be injected intraspinally without immediate or remote harm to the nervous system. He employed this measure in the treatment of delirium tremens, withdrawing fifty to sixty cubic centimeters of cerebrospinal fluid and injecting an equal quantity of a sterile 1 per cent. solution of sodium bromid. The patients as a rule displayed immediate improvement, with lessened delirium, within a few minutes after the injection. If relapses occur after a few days the injections are repeated.

PREVENTION OF ALCOHOLISM

An interesting suggestion in the treatment of alcoholism has been advanced by Spitzig (*Jour. A. M. A.*, Jan. 17, 1914) who has observed that many tipplers begin at an age when boyish habits and tastes yield to those of a man. At maturity the demand for carbohydrates is materially lessened and the appetite for alcohol replaces it in the tippler. There is sometimes a positive aversion to sugar. "The chemical relation of carbohydrates to alcohol is significant. Dextrose is convertible to carbon dioxid and ethyl alcohol. The combination of carbon, hydrogen and oxygen makes for increased nutrition whether it be derived from alcohol or indirectly from sugars and starches. The human organism when deprived of sufficient sugar seems of necessity to demand an increased supply of alcohol. Conversely, when the body is satiated with alcohol it has little need for carbohydrates." Based on this theory his treatment for chronic alcoholism consists in gradually withdrawing alcohol and replacing it in the diet with sugar. When there is a strong distaste for this he uses lactose, a dram every two hours, given in powder for the psychic effect. The gastric and nervous disturbances are appropriately treated and, after self-confidence is gained, all medication ceases and sugar is gradually reduced. With care, glycosuria can usually be avoided.

ILLUMINATING GAS POISONING

Persons poisoned with illuminating gas should receive at once as much fresh air as possible; the tongue should be drawn forward and if respiration is failing artificial respiration should be begun. The use of various devices has been advocated in such cases and a report on them has been issued by a committee appointed by the American Medical Association and the United States Bureau of Mines. In selecting such a device the possibilities of the machine for harm should be considered. The machine should be investigated as to its capabilities of producing suction, too great inflation, or other injury. Ordinarily the most simple devices or simple methods like the Sylvester method will serve.

Venesection should be done from one arm, and from "a pint to a pint and a half of blood should be removed," and simultaneously a quart of physiologic saline solution should be transferred into the median basilic or cephalic vein of the opposite arm. Two hours later, if there is not sufficient improvement, venesection may be done again. Saline solutions should be given subcutaneously every two hours in quantities of one pint. Or perhaps better the saline should be given by the colon by the continuous method. Jones (*Amer. Jour. Med. Sci.*, October, 1909) believes that these saline solutions "diminish toxemia, lessen the tendency to edema of the lungs, increase the affinity of the red cells for oxygen, and stimulate the circulatory system."

As soon as possible after the patient has been discovered Jones advises the hypodermatic injection of 2 c.c. (30 minims) of ether, 1/100 of a grain of atropin, and 2 c.c. (30 minims) of suprarenalin solution (1:1,000). He does not believe nitroglycerin or other vasodilators are indicated, but that vasoconstriction is what is needed. Dry heat should be applied to the body to prevent the loss of that necessity of life.

If at any time the respiration or circulation fails, artificial respiration should be done again and circulatory stimulants again administered.

If the patient survives, the urine should be watched daily for some time that disturbances of the kidneys may be immediately noted.

In all serious conditions of shock, coma and collapse, while everything that ought to be done should be done, there is a constant tendency to do too much, especially with drugs hypodermatically. Jones does not caution against the over-use of atropin or suprarenal preparations, but simply states that the suprarenalin should be repeated when indicated. If the suprarenal solution is injected hypodermatically the blood will acquire the vasoconstricting material slowly and continuously for a long time. Therefore it would be inadvisable to inject a suprarenal solution too frequently, especially at the dose he first advises, 2 c.c. of a 1:1,000 suprarenal solution, is very large, in fact, large enough for

serious consequences if the blood acquired it too rapidly.

He also does not state how often the ether should be administered, and it would seem that the secondary effect of ether would be that of a vasodilator, although the primary effect is quick and immediate stimulation. In other words, after the attempt to quicken the circulation or awaken a patient by the stimulation of ether hypodermatically it would seem inadvisable to repeat it frequently.

Also 1/100 of a grain of atropin hypodermatically should not be repeated frequently, certainly not for a number of hours.

It is not clear, if there is circulatory failure, why the hypodermatic use of strychnin is not advised.

As a circulatory and cerebral stimulant caffein should be considered, and also the hypodermatic use of a saturated solution of camphor in sterilized olive oil.

HEAT PROSTRATION AND SUNSTROKE

It is customary to divide the cases of illness due to excessive exposure to high temperature into two classes: one is distinguished as heat exhaustion; the other as sunstroke, or thermic or heat fever. It is important to recognize the distinction between these two classes of cases, as their treatment is entirely different and distinct.

Heat exhaustion is considered by many as a milder affection, although it frequently results in death. It may occur in those who are not exposed to the direct rays of the sun, but who are engaged in occupations which are accompanied by unusual heat, such as bakers, laundrymen, and foundrymen. It is associated with vasomotor paralysis. The beginning symptoms usually are dizziness, slight headache and throbbing in the head, nausea, and sometimes diarrhea; these symptoms increasing, the patient becomes cold, the skin becomes pale and clammy, great prostration ensues, the patient is restless, and may become unconscious. The temperature is usually subnormal, and is never elevated. The pulse is weak.

TREATMENT OF HEAT-EXHAUSTION

The treatment of this condition embraces removal of the patient from the influence of the excessive heat to which he has been subjected. If he has been out of doors in the sun, he should be immediately removed to the shade, and as quickly as practicable be taken into a house or to a hospital. He should be placed in bed in a room which is cool and well ventilated. The clothing should be loosened so as not to interfere with respiration or circulation, and his working clothes should be removed, and hot applications, such as hot water bottles or hot bricks, should be placed around his extremities so as to restore the circulation and make him warm. If he is unconscious so that he cannot swallow, inhalations of ammonia should be given by the nostrils. Cold applications, either cold cloths or an ice-bag, should be made to the head; a mustard paste should be applied to the back of the neck and over the spine; and if the respiration is obviously impaired, a hypodermatic injection of 1/100 of a grain of sulphate of atropin should be administered. If the heart is weak, a hypodermatic injection of 1/30 of a grain of strychnin sulphate should be given. As soon as the patient is able to swallow, he should be given half an ounce or an ounce of whisky, unless he was already under the influence of this drug before the attack came on. If the circulation is improved, the body becomes warm, and the patient regains consciousness.

A stimulating enema may be administered to move the bowels. The condition of the bladder should be investigated, and if the secretion of urine is scanty, the patient should be given copious draughts of water, and a little later an attempt should be made to give him nourishment, preferably in liquid form, and preferably hot, or at least warm.

In the second class of cases which are termed sun-stroke or heat fever, the patient will be found in an entirely different condition. Usually on the arrival of the physician the patient will be found to be exceedingly hot, with a dry skin, a congested face, with veins swollen and arteries throbbing. The patient's temperature will usually be found elevated to from

105 to 110 degrees, or even higher. There is great restlessness; the breathing may be stertorous; the pulse is full and rapid; the pupils, dilated at first, may become contracted, and unconsciousness may rapidly supervene. These symptoms may have come on without very much premonitory warning. They require prompt and active treatment.

TREATMENT OF SUNSTROKE

As in cases of heat exhaustion, if the patient is in the sun, he must at once be removed to the shade, and as soon as practicable to a cool and well-ventilated room. His clothing having been removed, and his temperature having been taken, he should, if practicable, be at once placed in a tub of water at a temperature of 80 F., to which ice should be gradually added. At the same time, ice should be applied to the head. While the patient is in the ice-bath, he should be rubbed vigorously to promote the peripheral circulation and bring the hot blood to the surface of the body where it may be cooled. The temperature should be taken in the rectum every fifteen minutes, and as soon as it has fallen to 102 the patient should be removed from the bath; otherwise the temperature may continue to fall until it becomes subnormal, and the patient may pass into a condition of collapse. Ordinarily this bath should not be continued longer than from twenty to forty minutes, but it may be repeated after an interval of two, three or four hours if the temperature should again become elevated. In some of these cases in which it is obvious that a congestion of the internal viscera is embarrassing the action of the heart, venesection may be performed, and a pint of blood may be removed. This loss of liquid from the circulation may subsequently be restored by the injection of physiologic saline solution, if it is deemed advisable.

If there seems to be a tendency to edema and congestion of the lungs, a hypodermatic injection of 1/100 of a grain of atropin sulphate should be administered.

If, after the temperature has commenced to fall, the pulse becomes weak, a hypodermatic injection

of 1/30 of a grain of strychnin sulphate may be administered.

If the elevation of the temperature is not so great, or if the use of the bath is impracticable, the patient may be laid on a cot, over which a rubber blanket has been placed, and a sheet rung out of cold water may be wrapped about him. He may then be rubbed with ice. After the sheet has become warm it may be removed and another one which has been allowed to soak in cold water may be substituted for the first.

In some cases it may seem wise to administer an antipyretic drug. Acetphenetidinum may be used, but its action should be carefully watched. In most cases the cold bathing is far preferable to the use of any antipyretic drug.

Woolley (*New York Med. Jour.*, 1914, xcix, p. 1165) believes that to replace the water lost to the body before the attack, and to increase elimination, there is no better method than infusion of saline solutions. If it is true that the oxygen content of the body is low and the acid content high, then such solutions should be alkaline. Woolley believes that such alkaline solutions as those recommended by Fischer are extremely efficacious whether given by rectum or intravenously, in neutralizing the acids of the body and increasing water elimination by the kidneys. The solution for rectal use he urges should be prepared as follows:

| | |
|------------------------------------|------------|
| Sodium chlorid..... | 30 gm. |
| Sodium carbonate (crystallized) .. | 20 gm. |
| Water | 1,000 c.c. |

The injection should be given slowly enough to allow retention. The time consumed in injecting a liter should not be less than one hour.

For intravenous injection the following solution may be used:

| | |
|------------------------------------|------------|
| Sodium chlorid..... | 14 gm. |
| Sodium carbonate (crystallized)... | 10 gm. |
| Water | 1,000 c.c. |

This also should be given very slowly.

The effect of these solutions on the secretion of urine, Woolley states, is remarkable, and as a rule they will make it unnecessary to use digitalis. When

this latter drug is used, it should be very carefully administered and its effects carefully watched. The use of strychnin is not advised in the active stage of the disease.

Such treatment will dispose of the immediate danger, and when this has been done treatment is symptomatic. In apyrexial heat exhaustion external hydrotherapeutic measures are uncalled for, and treatment should be eliminative and stimulative. The internal hydrotherapeutic methods should be very useful in these cases and should be combined with friction, massage, warm packs with sufficient internal stimulant medication. After recovery from an attack of insolation great caution must be observed by the patient to prevent recurrences from subsequent exposures to heat.

AFTER EFFECTS

Persons who have been the victims either of heat exhaustion or of heat fever often suffer more or less from the effects of heat during the remainder of their lives. It is always wise to warn patients or their friends of this possibility, and to direct them to avoid, as far as possible, exposure to the direct rays of the sun or to overheated rooms during the summer. They should be advised to practice cold bathing, and, if possible, sea bathing during the summer months. Sometimes the administration of tonics, and especially quinin sulphate combined with strychnin sulphate or extract of *nux vomica*, has seemed to aid these persons in withstanding the effect of the summer heat. Persons who seem to be predisposed to be affected by the heat should avoid exposing themselves as much as possible. They should dress lightly, should drink plenty of water, should avoid indulgence in alcoholic drinks, should keep their heads as cool as possible; and some recommend that the back should be protected by sewing an extra piece of flannel into the inside of the shirt so that it may protect the spinal cord. These precautions may wisely be observed by everyone in hot weather, and especially when an excess of humidity in the atmosphere diminishes the perspiration of those who are working, or are exposed to very hot air.

Some patients who have suffered severe sunstroke find that their memory is greatly impaired afterward, and that they never have the same mental ability and memory. Little can be done to benefit this condition, but if one feels that he should give the patient something in the hope that it may do some good, probably nothing will be more likely to prove beneficial than the glycerophosphate of calcium or some form of phosphorus.

Not infrequently infants and young children suffer from the effects of extreme heat. This condition should be looked for in children who are suddenly taken ill in the hot weather without any apparent reason. If they are found suffering from a high temperature for which no other explanation can be found, and if the history of the case shows that they have been exposed to high temperature, they should be placed under favorable conditions in a cool, airy room, and given a sponge bath of cool water, and cold drinks should be administered. If the heart becomes weak, small doses of whisky, well diluted, may be administered.

Sometimes after exposure to excessive heat there is twitching of the muscles, and even severe convulsions. When the convulsions occur and continue they may be controlled by a hypodermatic injection of $\frac{1}{4}$ grain of morphin, with $\frac{1}{150}$ grain of atropin. If they resist this treatment, the patient may be anesthetized by the administration of chloroform, or a rectal enema containing 2 gm. (30 grains) of bromid of sodium and 1 gm. (15 grains) of hydrated chloral may be administered and repeated, if necessary, after one hour.

ASPHYXIA

ASPHYXIA FROM SUBMERSION: DROWNING

Most individuals who become asphyxiated from submersion in water or from drowning are dead when they are taken out of the water, and all efforts to restore them to life are futile. This is especially the case if complete submersion has lasted four or five minutes. The occasional instance of the successful treatment of this form of asphyxia, however, make it incumbent on the physician to be thoroughly informed as to the

best methods to employ in the treatment of these cases, and to be prepared to carry them out if he happens to be near by when the patient is taken out of the water.

In the first place, the water must be expelled, so far as possible, from the respiratory passages. Probably there is no better way of doing this than by inverting the patient by taking hold of his feet and raising them up and letting his head hang down. This is a simple maneuver, provided the bystanders have strength enough to carry it out. Rolling the patient on a barrel is a crude and harsh substitute. Having removed the water as far as possible from the chest, the next thing to do is to perform artificial respiration. There are a number of methods of doing this.

The so-called method of Marshall Hall was first described in 1858, and consists in rolling the patient alternately from the lateral to the prone position and pressing on the back between the shoulder blades when he is in the latter position. This has the advantage that the tongue does not fall back into the throat and so obstruct the larynx, and the water and mucous are able to flow out of the mouth.

The following year the so-called Sylvester method was described. This consists in allowing the patient to lie on his back with his shoulders raised and his head hanging low. The operator then takes hold of the arms of the patient above the elbows and draws them gently away from his body until they arrive at a point above his head. This raises the ribs and increases the capacity of the chest. The arms then are carried down by the side and the elbows flexed and pressed against the lower part of the chest, thus diminishing the capacity of the chest and driving the air out. In this method the tongue is likely to fall back into the throat and interfere with respiration unless some one grasps it and pulls it forward.

In 1868, Dr. B. Howard of New York described a method of treating these cases which consists in laying the patient on his back while the physician kneels over the lower part of the body and presses on the lower part of the chest so as to diminish its capacity. He then relaxes the pressure, and the natural elasticity of the chest increases the air capacity. In this

method also the tongue is liable to fall backward, and must be drawn forward. It is objected that in elderly patients the ribs are brittle and may be fractured, and that the liver is congested and may be ruptured.

Finally it remains to describe the method known as that of Professor E. A. Schäfer, professor of physiology in the University of Edinburgh. He recommends that the patient be placed in the prone position. The physician being astride the patient, the open hands are placed on either side of the lower ribs and firm, but not violent pressure is exerted. This may be done by allowing the weight of the body to come on the arms. After this pressure has been exerted for three seconds the body may be brought upward and the pressure relaxed. This should be repeated at intervals of five seconds, or twelve times in a minute.

Schäfer made investigations with a view to comparing the utility of the various methods of artificial respiration. He found that in natural respiration the air exchanged in a minute by a person breathing thirteen times a minute was 5,850 c.c. The amount of tidal air at each breath therefore would be 450 c.c. Employing the Sylvester method, the amount of air exchanged in a minute was 2,280 c.c., showing the tidal air of each breath to be only 175 c.c. With the Marshall Hall method the exchange of air was 3,300 c.c., with a tidal air volume of 254 c.c. With the Howard method the exchange per minute is 4,030 c.c. and the tidal air volume 310 c.c. With his own method he was able to pump through the lungs per minute 6,760 c.c., showing a tidal air volume of 520 c.c. He therefore believes that this is the most efficient method of performing artificial respiration. He states that the advantages are: "1, it is fully efficient; 2, it can be performed without fatigue by a single individual; 3, it is simple and easily learned; and 4, it allows the tongue to fall forward, and the mucus and water to escape from the mouth, so that the tendency of these to block the passage of air, which is inherent to the supine position, is altogether obviated."

This subject was discussed at considerable length by Professor Schäfer in *The Journal of the American Medical Association*, Sept. 5, 1908, page 801.

In treating these cases it is important to preserve so far as possible the warmth of the patient. Woolen blankets should be obtained, and, after the surface of the body has been thoroughly dried, wrapped about him. While artificial respiration is being employed, friction of the surface of the body, especially from the extremities toward the center, should be carefully but not roughly done. It is recommended that artificial respiration should be continued for from one to two hours, but it seems that there is very little use in continuing efforts to restore respiration after the action of the heart has ceased. As long as the action of the heart continues the artificial respiration should be continued, regularly and systematically.

Some hospitals are establishing apparatus for promoting and compelling respiration in patients who have from ether, chloroform or other causes, ceased to breathe. In the consideration of gas poisoning it was pointed out that the use of these devices may at times be attended with danger. In selecting such devices for permanent installation, physicians should advise only those of simple mechanism and guaranteed safety.

DISEASES OF THE EYE

OPHTHALMIA NEONATORUM

The prevention of this inflammation of the eye is of national importance, and should be understood and carried out by every practitioner who takes charge of obstetric cases. The use of Crede's method has secured an immense reduction in the number of these cases. It should be remembered, then, that by this means this disease is practically absolutely preventable.

PROPHYLAXIS

As soon as the child is born and after thoroughly cleansing the eyes, instill a drop of a 1 per cent. nitrate of silver solution. While Credé advised the use of a 2 per cent. solution, it is generally believed that the 1 per cent. is of sufficient strength. This may be followed by a little physiologic saline solution or a drop of adrenalin chlorid solution (1:5,000). This "stops the pain and neutralizes the further action of the silver." Other more modern silver preparations have also been advised, as 25 per cent. argyrol or 10 per cent, protargyrol, but they are probably not so reliable as the silver nitrate.

ACTIVE TREATMENT

If in spite of such prophylactic treatment the conjunctivæ may become inflamed, the conjunctivæ should be thoroughly cleansed. The lid of the eye is gently raised, all pressure being avoided, and the tip of a soft rubber bulb syringe is inserted under the upper lid. Slowly and gently the eye is irrigated with a saturated cold boric acid solution to wash out all purulent matter. This should be done every fifteen minutes, or oftener if the discharge is profuse. Mercuric chlorid (1:10,000), normal saline solution, or sterile water may also be used as cleansing agents.

Iced compresses of boric acid solution may be applied to secure lessened inflammation and relief from pain.

Continuous refrigeration, however, should be avoided to prevent loss of nutrition which may result from it. If the cornea is involved hot applications and instillation of atropin is generally advised.

In the treatment of these cases silver nitrate is the drug of chief reliance. Once each day during the course, especially while there is a purulent discharge, a 1 or 2 per cent. solution of silver nitrate should be brushed on the everted conjunctiva. If eversion of the lids is extremely painful, they may, at first, simply be raised and the silver nitrate solution applied with a well-protected swab.

Every three or four hours a few drops of argyrol solution in strength of from 25 to 50 per cent., or protargyrol, 10 per cent., may be instilled into the eye.

If the discharge and inflammation persist, it may be necessary to consider surgical procedures or specific treatment of the complications. The disease is a serious one and the services of a specialist may be required early in its course.

BLEPHARITIS

The occurrence of inflammations of the lids has been associated with numerous causes, chiefly general debilitated condition of the body, following infectious diseases, lack of cleanliness and errors of refraction. Bad hygienic surroundings, lack of sleep, irritating atmosphere due to dust, heat, smoke or other causes and insufficient light also play a part in some cases.

The correction of these general causes is important, more important perhaps than any local treatment. Local cleanliness and removal of any bad eye-habits should be attempted and persisted in. Errors of refraction should be corrected and referred to a competent refractionist for prescription. The occupation of the patient as a source of irritation should be thoroughly investigated.

In securing cleanliness of the eyes, the edges of the lids should be washed with soap and water, or water and borax, or solutions of hydrogen peroxid, removing all crusts if possible without serious injury. As sedative eye washes, Brav recommends the following:

| | gm. or c.c. | |
|------------------------------|-------------|-----------|
| R Acidi borici..... | 2 | 3 ss |
| Zinci phenolsulphonatis..... | 15 | or gr. ii |
| Aquae camphorae..... | 15 | fl̄ss |
| Aquam destillatam.....ad | 100 | fl̄iii |

M. Sig.: Bathe the eyes with this solution, three times daily.

Also efficient is the following used as eye drops:

| | gm. or c.c. | |
|--------------------------|-------------|---------|
| R Acidi borici..... | 25 | gr. v |
| Aquae camphorae..... | 15 | or fl̄v |
| Aquam destillatam.....ad | 25 | fl̄i |

M. Sig.: Place two or three drops in each eye three or four times a day.

Massage of the lids is a therapeutic measure of wide usage in this condition. Among various ointments advised adeps lanae hydrosus (lanolin), ammoniated mercury, 2 per cent. yellow oxid of mercury, and ichthyol have been commended. Gentle massage by horizontal stroking movements on the closed lids with the index finger, carried from the inner to the outer angle of the palpebral fissure, and lasting from three to five minutes, relieves venous congestion and stimulates the activity of the lymphatics, and absorption of inflammatory products is increased. This ointment, or vaselin if preferred, will soften the scales and allow them to be removed, thus aiding in getting rid of the blepharitis. Such massage is best done at bedtime, when some of the ointment may be left on the lids. In the morning the ointment may be washed off, and with it will come many of the scales. The yellow oxid of mercury seems to be a most valuable medicament for healing the lesions of this inflammation. It may be ordered as follows:

| | gm. | |
|-------------------------------|-----|-------|
| R Hydrargyri oxidi flavi..... | 10 | gr. i |
| Olei olivae.....q. s. | | or |
| Petrolati | 10 | 3 ii |

M. Sig.: Apply at bedtime as directed.

This makes 1 per cent. of the yellow oxid of mercury. It should be remembered that the official yellow oxid of mercury ointment is 10 per cent.

Brav believes that in some cases salicylic acid ointment has a more favorable action, especially when there is much itching of the lids, as:

| | | | |
|---------------------------|-----|----|--------|
| | gm. | | |
| R Acidi salicylici..... | 15 | or | gr. ii |
| Adipis lanae hydrosi..... | 10 | | 3 ii |

M. Sig.: Apply as directed.

If itching is very marked Brav uses a tannic acid ointment, as:

| | | | |
|----------------------|-----|----|--------|
| | gm. | | |
| R Acidi tannici..... | 15 | or | gr. ii |
| Petrolati | 10 | | 3 ii |

M. Sig.: Use as directed.

Occasionally he uses cocain as follows:

| | | | |
|----------------------|-----|----|--------|
| | gm. | | |
| R Acidi tannici..... | 15 | | gr. ii |
| Cocainae | 10 | or | gr. i |
| Petrolati | 10 | | 3 ii |

M. Sig.: Use as directed.

If the tannic acid preparations cause irritation they should be discontinued. If the itching persists, the dried secretion in the little glands should be carefully expressed from the ducts.

In treating the ulcerative type of blepharitis, or more severe types, it may be necessary to pull out all the eyelashes before undertaking the treatment. The use of silver nitrate is advised in these severe forms, and applications are made once daily with a 1 or 2 per cent. solution.

HORDEOLUM (STYE)

The sty is a fairly common form of eye infection. It is ordinarily a staphylococcus infection of a sebaceous follicle, around the lash, but may occur inside the lid as an internal hordeolum or suppurating chalazion.

As the sty is, as has been stated, primarily a staphylococcus infection, its source should be looked for in lowered resistance due to local uncleanness, general debilitation or constipation and errors of refraction.

Attempts may be made to abort the sty by cold applications but ordinarily when seen, it will be too far advanced for such a procedure. As in any other local infection, hot compresses may then be applied and

when pus manifests its presence by a yellowish appearance the pus should be evacuated, incising as freely as necessary, and the area may be cleaned up by a mild antiseptic washing.

If the hordeolums occur in crops or tend to recur frequently, general treatment in hygienic matters is indicated, and the use of autogenous vaccines may serve to create a more or less permanent cure with immunity from further attacks.

IRITIS

Inflammation of the iris may be acute or chronic, primary or secondary in its origin, and associated etiologically with syphilis, rheumatism, tuberculosis, gout, gonorrhea, malaria, diabetes, anemia or any of the acute exanthems. Iritis seldom occurs without a simultaneous inflammation of the ciliary body.

Besides the actual pathologic changes in the iris and neighboring structures there are ordinarily pain, lacrimation, interference with vision and a fear of light. Ordinarily the duration of the disease is from several weeks to several months.

TREATMENT

In the treatment of iritis both eyes should be placed at rest; smoked glasses may be worn. The patient's general condition should be regulated, the bowels controlled and sufficient sleep secured by the administration of hypnotics or morphin if necessary. When the pain subsides the patient should be in the open air as much as possible.

Needless to state, the primary condition associated with the ocular inflammation should be treated energetically. Syphilis, tuberculosis, gout and rheumatism are all conditions which demand active scientific treatment.

The most important drug in the treatment of iritis is atropin, which should be used in sufficient dosage to produce a full physiologic effect on the pupil. In children it should be used with care to prevent poisoning. In general a 1 per cent. solution may be used, of which one drop is instilled into the eye every hour until the pupil is dilated. Following this one drop every eight

hours is used to secure continued action. In children a 0.5 or 0.25 per cent. solution is advisable. When atropin is not well borne and causes unpleasant symptoms, Brav suggests the following mixtures:

| | | |
|-----------------------------|-------------|--------------|
| | gm. or c.c. | |
| R Duboisinae sulphatis..... | 10 | 035 or gr. ½ |
| Aquae destillatae..... | | ℥3 iiss |

M. Sig.: One drop instilled into the affected eye every eight hours.

Or:

| | | |
|-------------------------------|-------------|--------------|
| | gm. or c.c. | |
| R Scopolaminae hydrobromidi.. | 8 | 015 or gr. ¼ |
| Aquae destillatae..... | | ℥3 ii |

M. Sig.: One drop instilled into the affected eye, three times daily.

If undesirable symptoms from the action of atropin occur, such as very uncomfortable drying of the throat, palpitation, flushing of the face, and cerebral excitation, then the stronger atropins must be discarded and homatropin used.

| | | |
|-------------------------------|-------------|--------------|
| | gm. or c.c. | |
| R Homatropinae hydrobromidi.. | 10 | 40 or gr. vi |
| Aquae destillatae..... | | ℥3 iiss |

M. Sig.: One drop in the affected eye every hour.

[If both eyes are inflamed, the strength of the above preparations, in order for a drop to be used in each eye, must be reduced.]

During the course of the inflammation the tension of the eye must be carefully watched lest glaucoma develop, though a temporary increase in intraocular pressure is often seen. As soon as the eye shows increased tension, Brav thoroughly evacuates the bowels, gives absolute rest, and stops the atropin. If the tension does not then in a few hours decrease he uses eserine, as:

| | | |
|--------------------------------|-------------|-------------|
| | gm. or c.c. | |
| R Physostigminae sulphatis.... | 8 | 03 or gr. ½ |
| Aquae destillatae..... | | ℥3 ii |

M. Sig.: One drop in the affected eye every hour.

Brav says that it is not often necessary to have recourse to this treatment, and it is rarely necessary to employ surgery to prevent glaucoma from iritis.

The value of atropin in iritis is to dilate the pupil and thus to prevent posterior synechiæ. It also contracts the iris, thus reducing congestion, and paralyzes the ciliary muscles, thus giving the iris absolute rest.

If the pain from the inflammation is not stopped by the atropin, hot moist compresses, frequently changed, should be employed. Poultices are not needed. If the pain persists in spite of such treatment, leeches should be applied, one or two to the temporal region, care being taken to avoid the large blood vessels. If in spite of such treatment the deep-seated pain in the orbit continues, so as to prevent sleep, morphin must be used, and best hypodermatically.

If the iritis is due to rheumatism, salicylates are advisable; and Brav recommends the following:

| | gm. or c.c. | |
|---|-------------|------------|
| R Sodii salicylatis..... | 15 | or ʒ ss |
| Potassii iodidi..... | 15 | |
| Syrupi sarsaparillae compositi | āā 100 | |
| | | ʒʒ iii |

M. Sig.: A teaspoonful, with plenty of water, every four hours.

Brav finds suprarenal solutions useless, and perhaps harmful.

Cocain may be combined with atropin at times, as:

| | gm. or c.c. | |
|------------------------------|-------------|--------------|
| R Cocainæ hydrochloridi..... | 03 | or gr. ss |
| Atropinæ sulphatis..... | āā 03 | |
| Aquæ destillatæ..... | 8 | |
| | | ʒʒ ii |

M. Sig.: One drop instilled into the affected eye, every three or four hours, if necessary.

The treatment of hypopyon or posterior synechia is a subject for a specialist.

As it is stated that at least 50 per cent. of iritis is caused by syphilis and that mostly in the secondary stage, constitutional treatment during such iritis is that of the syphilis, and mercury is the important drug. Brav thinks it is best administered in the form of an ointment, and advises the rubbing on of 4 grams (1 dram) of the unguentum hydrargyri into the skin twice daily, choosing different parts of the body at each appli-

cation. If symptoms of mercurialism occur, of course the drug should be temporarily stopped, and during its administration alkaline mouth washes should be used.

When the inflammatory symptoms are declining Brav finds potassium iodid of value in promoting the absorption of the inflammatory products. Syphilis having been the cause of the iritis, of course it must be long treated else the iritis may recur, as well as other symptoms of syphilis.

If rheumatism is the cause of the iritis he would not only give salicylates, as intimated above, but during the height of the disease he would give large doses, as a gram of sodium salicylate (15 grains) every four hours, during the daytime.

After the iritis has subsided, especially after anti-syphilitic or antirheumatic treatment, the patient generally needs iron.

BURNS OF THE EYE FROM LIME

This form of accident occurs quite frequently, and is ordinarily followed by very grave results. The most serious and important sequel is the adherence of the lid to the globe (symblepharon) when there are two opposing raw surfaces. If the patient is seen immediately after the accident, the first step in the treatment is to drop into the conjunctival sac a few drops of a 1 per cent. solution of holocain, or of a 4 per cent. solution of cocain, in order to relieve the pain, which is usually intense, and then to remove all the remaining particles of lime as quickly as possible. The irrigating fluid should be a weak solution of vinegar, to neutralize the caustic effect of the lime. Subsequently cold applications should be applied to the closed lids, and a mild antiseptic, such as a 3 per cent. boric acid solution, dropped into the eye every two or three hours. If the burn is at all extensive, the conjunctival sac should be filled with an antiseptic ointment, which not only relieves the pain, but also prevents adhesion of the opposing surfaces. One of the best preparations for this purpose is a mercuric chlorid ointment which consists of mercuric chlorid (1:10,000) in petrolatum. Severe burns from lime, resulting in complete opacity

of the cornea, have been treated — in addition to the usual local treatment — by subcutaneous injections of sodium cacodylate (from 3 to 7 grains at a dose) with perfect results.

After emergency treatment has been administered, if the case appears to be at all severe, the patient may well be referred to a specialist in such conditions.

DISEASES OF THE EAR

OTITIS MEDIA

All kinds of bacteria may reach the middle ear, but the most frequent infections are the streptococcic and the pneumococcic. In a healthy ear the bacteria reach the tympanic cavity through the Eustachian tube, and this presupposes a nasopharyngeal infection and inflammation. Obstruction at the mouths of the Eustachian tubes, or swelling in the tubes, then inhibits the normal aeration of the tympanic chamber and predisposes to infection of the middle ear. Hence prophylaxis of middle-ear inflammations consists in the removal of obstructive adenoids in the nasopharynx, in the removal of obstructive hypertrophies of the nasal passages so as to cause proper nasal respiration and the correction, so far as possible, of nasal and nasopharyngeal chronic inflammations.

In acute inflammations of the nose and nasopharynx when the Eustachian tubes are likely to become obstructed and bacteria are likely to reach the middle ear, a proper cleansing of the nose and nasopharynx with warm, mildly antiseptic and alkaline sprays and gargles is the proper treatment. Nasal douches as generally applied are likely to force fluid, pus and bacteria into the middle ear, in fact, a douche should never be taken through the nostrils with any but the most gentle pressure. Snuffing mild, warm, alkaline fluids through the nostrils, or gently spraying and then snuffing, or possibly the pouring of such a fluid from a spoon or small vial into the nostrils can do nothing but good and no harm to the Eustachian tubes. Or gentle spraying into the nasopharynx with such solutions or gargling and throwing the head forward so that the liquid washes the roof of the pharynx, will also remove products of inflammation, pus and mucus from these parts and from the mouths of the Eustachian tubes. Hektoen and Rappaport have shown that the insufflation into the nose of kaolin will result in the removal of most of the bacteria.

If middle-ear congestion occurs the diagnosis must be made as to whether serum or other fluid is present or not. If fluid is present, as shown by bulging of the tympanic membrane and by deafness, incision of the drum must be immediately made. If no fluid is present in the tympanic cavity, but the drum shows congestion and there is pain, the following ear drops may be used:

| | gm. or c.c. | | |
|---------------------|-------------|----|--------|
| R Acidi borici..... | 1 | or | gr. xv |
| Glycerini | 25 | | ℥ss i |
| Aquam | ad 50 | | ℥ss ii |

M. Sig.: Warm, and pour half a teaspoonful into the ear once in three or four hours.

This fluid should be held in the ear a minute or two and then allowed to run out. The outer part of the canal is then gently dried with absorbent cotton and a plug of cotton left in the orifice.

If preferred, either of the following prescriptions may be used:

| | gm. or c.c. | | |
|---------------------|-------------|----|---------|
| R Acidi borici..... | 1 | or | gr. xv |
| Glycerini | 10 | | ℥ss iii |
| Tincturae opii..... | 5 | | ℥ss iss |
| Aquam | ad 50 | | ℥ss ii |

M. Sig.: Warm, and place a few drops in the ear every hour, if needed, and then plug with cotton.

Or:

| | gm. or c.c. | | |
|-----------------------------|-------------|----|--------|
| R Epinephrini chloridi..... | 0.3 | or | gr. ss |
| Glycerini | 20 | | ℥ss v |
| Aquam | ad 25 | | ℥ss i |

M. Sig.: Warm, and pour half a teaspoonful into the ear every three hours.

It should again be emphasized that treatment, even as simple as the above, should only be used to relieve congestion and pain, but such temporizing measures should not be used if the drum is bulging and there is liquid in the middle ear. The only treatment for this condition is incision.

Treatment after incision or after perforation of the drum, or of mastoid congestion, and of mastoid inflammation, belongs to the specialist. The restoration of a perfect drum and the recovery of perfect hearing after

middle-ear disturbance, and especially after mastoid inflammation, marks a success as great as in any branch of medicine. The general physician's duty ends when he has referred a patient with either acute or chronic ear disturbance to the specialist, and after he has impressed on his patient that the time to prevent, if possible, deafness and the danger of a possible cerebral abscess is now. If the patient neglects his own treatment after warnings, he has only himself to thank, but let him never be allowed the opportunity to blame his physician.

SOLUTIONS FOR USE IN THE EARS

| | gm. or c.c. | | |
|----------------------------------|-------------|----|---------|
| R Cocainae hydrochloridi..... | 0 | 20 | gr. iv |
| Sodii boratis..... | 0 | 50 | gr. x |
| Solutionis epinephrini (1:1,000) | 5 | or | |
| Glycerini .....āā | 5 | | flʒ iss |
| Aquae camphorae.....q. s. ad | 50 | | flʒ ii |

M. Sig.: Ear drops. Warm before using.

| | gm. or c.c. | | |
|-------------------------------|-------------|----|---------|
| R Cocainae hydrochloridi..... | 0 | 15 | gr. iii |
| Acidi borici..... | 0 | 25 | gr. v |
| Glycerini | 10 | or | flʒ iii |
| Aquae .....q. s. ad | 25 | | flʒ i |

M. Sig.: Ear drops. Warm before using.

| | gm. or c.c. | | |
|---------------------|-------------|----|----------|
| R Acidi borici..... | 2 | or | gr. xxxv |
| Tincturae opii..... | 10 | | flʒ iii |
| Glycerini | 20 | | flʒ vi |
| Aquae .....q. s. ad | 50 | | flʒ ii |

M. Sig.: Ear drops. Warm before using.

| | gm. or c.c. | | |
|-----------------------------|-------------|----|--------|
| R Epinephrini chloridi..... | 0 | 03 | gr. ½ |
| Glycerini | 20 | or | flʒ vi |
| Aquae .....q. s. ad | 50 | | flʒ ii |

M. Sig.: Ear drops. Warm before using.

DISEASES OF THE SKIN

PRURITUS: ITCHING

Pruritus, or itching, represents one of the most puzzling problems in medicine. The clinical manifestations are connected with the terminations of the sensory nerves in the epidermis. Many believe that it is associated with hyperemia and inflammation, this condition sometimes resulting in atrophy, with a continuance of itching. There are many reasons for believing that these pathologic conditions are not the efficient cause of the itching in many cases. For example, *Oxyuris vermicularis*, or pin-worm, causes pruritus in children without any local lesion or disturbance in the nutrition of the skin evident on inspection, and the pruritus is probably not due to the presence of a foreign body on the skin. It is also a question whether the itching produced by pediculi, or lice, is due alone to their presence on the skin in a quiescent state or even in active movement. The rapidity with which the itching in scabies subsides under sulphur treatment indicates that it is due to something besides the presence of a foreign body. Itching produced by a bite of a mosquito is out of all proportion to the local congestion and inflammation and is no doubt due to some poison injected by the mosquito. The itching associated with jaundice dependent on obstruction to the flow of bile into the intestine is due to the irritation of the ends of the sensory nerves by some substance absorbed from the bile into the blood. The itching in urticaria, due usually to the ingestion of some unusual article of food, is probably caused by some poison carried to the nerve-endings in the blood as in the case of jaundice.

It will be noted that many diseases accompanied by congestion and inflammation of the skin cause itching, but it is a curious fact that syphilis, which is constantly accompanied by cutaneous lesions, has a striking characteristic that its skin lesions are usually unaccompanied by itching.

With certain general diseases pruritus is a common symptom, especially diabetes and that common condition associated with abnormal metabolism, known as lithemia, and which is believed by many to be associated with gout. These diseases are all characterized by the presence in the blood of chemical bodies, which ordinarily do not belong there.

It is taught that pruritus may be of central origin. It is asserted to be of not infrequent occurrence in hypochondriasis and hysteria. Still another form is described as being of psychic origin, and is seen in insane persons who have hallucinations of the presence of parasites, such as pediculi, on the skin; hallucinations which it is often difficult to remove, and which are sometimes removed only after repeated applications of antipruritic remedies.

MANAGEMENT

In undertaking the treatment of a case of pruritus it is necessary to investigate every organ of the body so as to restore to its normal action, if possible, any organ which may be acting abnormally or which may be under abnormal conditions. First, the condition of the digestive organs must be carefully investigated, and the diet must be carefully regulated. There are two types of people in whom pruritus is seen: one is the stout, robust, plethoric person who is continually overeating, and the other is the thin, hungry person who is continually starving himself. In the case of the former the diet should be cut down. The protein substances should be greatly reduced, and the starches and sugars should be considerably limited. If it is found that certain articles of food are not completely digested but give rise to fermentation, such articles should be reduced to an amount that can be taken care of by the digestive organs. In the latter class, the thin patients, fatty articles of food should be advised, and an adequate amount of protein should be given to afford adequate nourishment. In both classes, fruits, especially oranges and grapes, will be found exceedingly useful.

If the bowels are constipated, measures should be taken to make them act regularly and abundantly.

Small doses of calomel, for a week or two, are sometimes useful for this purpose. If calomel is thought to be undesirable a saline as 1 or 2 drams of magnesium sulphate or sodium phosphate may be given in half a glassful of water in the morning before breakfast.

ELIMINATION

Pruritus is frequently associated with deficient elimination, and especially of the kidneys. If the condition of the urine is found to indicate such defective elimination, the internal use of alkalies will generally be found of advantage. In the case of the plethoric individual, with a strongly acid urine of high specific gravity, the following prescription may be used:

| | | |
|-----------------------------|-------------|-----------|
| | gm. or c.c. | |
| R Potassii citratis..... | 40\| | 3 ix |
| Aquae menthae piperitae.... | 200\| | or fl5 vi |

M. Sig. Two teaspoonfuls, in water, three times a day, after meals.

If the above dose, three times a day, does not alkalinize the urine (if that is the object desired), it may be administered four times a day.

Although it is admitted that pruritus is associated with the sensory nerves, and it is claimed that in some instances it is due to a disturbance of the central nervous system, no drug acting on the brain, spinal cord or nerve trunks is very effective in pruritus, possibly with a single exception of bromids, which really act by dulling the peripheral endings of the nerves. The treatment of pruritus with bromids is generally inadvisable, as they act by causing nerve debility and later muscle debility and loss of nutrition. Temporarily such treatment is often good treatment.

LOCAL APPLICATIONS

Generally, in order to stop the itching, it is necessary to apply some drug to the skin which will lessen the sensibility of the ends of the nerves which are in trouble. Several drugs are used for this purpose. The most useful are phenol (carbolic acid), menthol, camphor, chloral, thymol, oil of cade, alcohol and alkalies.

The following are a few prescriptions which are suggestive. Various modifications of any one of them may act satisfactorily.

| | gm. or c.c. | |
|--------------------------------|-------------|----------|
| R Phenolis | 5 | |
| Liquoris potassae.....āā | 5 | or fl̄ss |
| Petrolati liquidi.....q. s. ad | 50 | fl̄ii |

M. Sig.: Use externally as directed.
Shake.

Or:

| | gm. or c.c. | |
|----------------------|--------------|-----------|
| R Phenolis | 3 | fl̄i |
| Glycerini | 10 | or fl̄iii |
| Liquoris calcis..... | 25 | fl̄i |
| Aquae | q. s. ad 100 | fl̄iv |

M. Sig.: Sponge over irritated surfaces.
Shake.

Or:

| | gm. or c.c. | |
|----------------------------|-------------|----------|
| R Phenolis | 25 | fl̄vi |
| Liquoris calcis..... | 125 | or fl̄iv |
| Oleum amygdalae dulcis..ad | 250 | fl̄viii |

M. Sig.: Use externally as directed.

Or:

| | gm. or c.c. | |
|-------------------------|-------------|---------|
| R Mentholis | 50 | gr. vii |
| Sodii bicarbonatis..... | 15 | or ̄ss |
| Glycerini | 25 | fl̄vi |
| Aquam | ad 250 | fl̄viii |

M. Sig.: Use externally as directed.

Or:

| | gm. or c.c. | |
|----------------------------|-------------|--------------|
| R Mentholis | 50 | gr. x |
| Camphorae | 1 | or gr. xviii |
| Olei amygdalae dulcis..... | 2 | m xxxv |
| Adipis lanae hydrosi..... | 25 | ̄i |

M. Sig.: Use externally.

Or:

| | gm. or c.c. | |
|----------------------------|-------------|--------|
| R Mentholis | 30 | gr. v |
| Phenylis salicylatis..... | 2 | or ̄ss |
| Olei amygdalae dulcis..... | 2 | fl̄ss |
| Adipis lanae hydrosi..... | 20 | ̄v |

M. Sig.: Use externally.

440 LOCAL APPLICATIONS FOR PRURITUS

Or:

| | gm. or c.c. | |
|-----------------------|-------------|---------|
| R Camphorae | 15 | |
| Chlorali hydrati..... | 15 | or 3 ss |

M. Sig.: Paint over affected part.

Or:

| | gm. or c.c. | |
|-------------------|-------------|---------|
| R Mentholis | 1 | gr. xv |
| Thymolis | 2 | gr. xxv |
| Aquae | 100 | fl3 iii |

M. Sig.: Use externally.

Or:

| | gm. or c.c. | |
|------------------------|-------------|----------|
| R Camphorae | 5 | gr. lxxv |
| Zinci oxidi..... | 15 | or 3 ss |
| Cretae preparatae..... | 30 | 3 i |

M. et fac chartulam 1.

Sig.: Use as a dusting powder.

Or:

| | gm. or c.c. | |
|-------------------|-------------|----------|
| R Camphorae | 5 | gr. lxxv |
| Zinci oxidi..... | 15 | or 3 ss |
| Amyli | 30 | 3 i |

M. et fac chartulam 1.

Sig.: Use as a dusting powder.

Or:

| | gm. or c.c. | |
|--------------------|-------------|---------|
| R Olei cadini..... | 5 | fl3 iss |
| Petrolati | 50 | or 3 ii |

M. Sig.: Use externally.

Or:

| | gm. or c.c. | |
|---------------------------|-------------|---------|
| R Olei cadini..... | 5 | fl3 iss |
| Adipis | 25 | or 3 i |
| Adipis lanae hydrosi..... | 25 | |

M. Sig.: Use externally.

Various other forms of tar may be used if desired.
The following modified Wilkinson's salve is useful:

| | gm. or c.c. |
|-----------------------------|-------------|
| R Sulphuris sublematis..... | |
| Olei rusci..... | 8 |
| Saponis viridi..... | |
| Adipis | 15 |
| Cretae praeparatae..... | 5 |

M. et ft. ung.

In preparing this ointment the best oleum rusci should be used; if possible that having the peculiar odor of Russia leather. If this cannot be obtained either oleum picis or oleum cadinum may be substituted for it.

As a lotion the following antipruritic mixture will be found extremely soothing:

| | gm. or c.c. | |
|---------------------------|-------------|----|
| R Zinci oxidi..... | 12 | |
| Talc | 10 | |
| Sodii biboratis..... | 10 | |
| Mentholis | 1 | 80 |
| Glycerini | 6 | |
| Aquae calcis.....q. s. ad | 180 | |

M. et ft. lotio.

Sig.: External use.

Or:

| | gm. or c.c. | |
|-------------------------|-------------|------------|
| R Tincturae iodi..... | 5 | |
| Tincturae opii.....aa | 5 | or fl̄ iss |
| Glycerini .....q. s. ad | 25 | fl̄ i |

M. Sig.: Paint on externally.

The above prescription may be used when only a small part itches, as a chilblain, or something of that description.

Various alcohol and menthol sprays and washes, or simple saline sprays are often satisfactory. The following is a menthol spray:

| | gm. or c.c. | |
|-------------------|-------------|------------|
| R Mentholis | 1 | gr. xv |
| Alcoholis | 100 | or fl̄ iii |
| Aquam .....ad | 200 | fl̄ vi |

M. Sig.: Use externally with an atomizer.

The question of the use of alcohol and tobacco is usually raised in connection with the treatment of pruritus, and it is generally advised that both should be forbidden. Certainly, the vast proportion of people who use tobacco and alcohol are not affected with pruritus. This of course does not indicate that they may not be detrimental to sufferers from pruritus, and possibly in some instances their use aggravates the condition. In such cases their discontinuance should certainly be advised; but in most cases their use or disuse will probably prove to be a matter of indifference.

PRURITUS ANI

While it is universally insisted that the term "pruritus" should be strictly limited to such itching affections of the skin as are not accompanied by any recognizable lesion, the term "pruritus ani," on the other hand, is used much more broadly, so that under it are commonly included such affections about the anus as are accompanied by itching but do not show any manifest lesion, and also those conditions in which there are decided pathologic changes in the skin and in which intense itching is the most important symptom. Pruritus ani commands the attention and interest of the general practitioner, the proctologist, the dermatologist, and, at times, the neurologist.

ETIOLOGY

The physician does not do his full duty to his patient, if he prescribes for itching about the anus without making a careful examination of that region and interrogating the patient in regard to his habits and the manner in which the functions of the different organs are performed. It is, ordinarily, a simple matter to determine whether the itching is due to the presence of the *Oxyuris vermicularis* (pin-worm) or to the presence of pediculi. The occasional occurrence of these parasites in this region and their causative relation to the production of itching should not be overlooked. On local examination, it is frequently possible to detect the presence of a fissure of the anus, or an ulcer in that situation, or within the sphincter ani muscle. In other cases there may be found a fistula, hemorrhoids, or polypi; and further exploration of the rectum may show a catarrhal condition of the mucous membrane, or a disease of the crypts.

At the beginning of the condition it may be impossible to find any lesion, but, as the case progresses unrelieved, the energetic scratching in order to relieve the itching usually produces a thickening of the skin. Inflammation of the skin occurs, causing an increase of the connective tissue which presses on the nerve endings. This may be followed by an atrophic condition of the superficial layer of the skin. The thickened epidermis may have a whitish, sodden appearance,

and may lie in folds, on or between which there may be fissures caused by the scratching.

Many cases are accompanied by a condition of moisture of the skin about the anus. Some believe that this moisture is the cause of the itching, but it is more probable that in most cases it is an accompaniment of the condition that gives rise to the itching, or may accompany that lesion of the skin which is produced or aggravated by scratching. This moisture is probably due to a hypersecretion of the sebaceous glands, but it is possible that a part of it comes also from the sweat glands.

In some cases it will be found that a disturbance remote from the local manifestation gives rise to the itching. Congestion of the mucous membrane of the intestine accompanied by a catarrhal condition; congestion of the liver may be accompanied by a congestion about the anus which gives rise to intolerable itching. Pressure on the veins, as from the enlarged uterus during pregnancy, or from pelvic or abdominal tumors, may produce similar effects.

Some general diseases are occasionally accompanied by pruritus ani. The most important of these is diabetes, but the condition may be present in chronic nephritis, in gout, and in rheumatism. It is also a not infrequent accompaniment of the degenerative changes which accompany old age. Some cases show a decided neurotic element. Sometimes business or professional men who are actively engaged in following their vocation and who are subject to unusual nervous and mental strain are the subjects of this disorder. These various conditions, which do not cover all the causes which have been enumerated as etiologic factors of this itching, indicate that there is a wide scope for the use of judgment in selecting a line of treatment appropriate for each individual case. When this condition is an incident of senility, or of such general diseases as diabetes or nephritis, the treatment is generally palliative, by means of local applications. Of course, any improvement in the diabetes, or in the nephritis, will cause improvement in the local trouble.

MANAGEMENT

The dietetic management of the case and the employment of such remedies as promote excretion of the products of metabolism are clearly indicated. In a large number of patients it will be found that a rearrangement of the diet is of great importance. Many of these patients eat too much, and their diet should be restricted so that they eat less and limit the amount of food to the needs of the system. In some patients who present symptoms which are commonly called lithemic, a limitation of the amount of protein ingested, and more especially a reduction of the meat to once a day, is advisable. In other patients, it will be found that there is a tendency to use an excessive amount of sugars and starches, and in such individuals these elements of the food should be restricted.

In many cases there is constipation, accompanied, sometimes, by intestinal fermentation. If this constipation cannot be corrected by a regulation of the diet, some laxative may be necessary. Aloes sometimes seems to do harm by increasing the irritability and congestion about the rectum. Usually cascara sagrada or a saline cathartic is preferable. Sometimes it is well to give a moderate dose of cascara sagrada at night and follow this by a saline laxative in the morning, regulating the dose so that the patient may have one soft movement after breakfast.

If the urine is highly colored, of high specific gravity, or is strongly acid, the administration of alkalies such as potassium citrate is useful.

Frequently an operation, it may be slight or it may be of considerable gravity, is indicated. If there are tags of hypertrophied skin, they should be snipped off. If there are hemorrhoids, they should be removed. If there is a fissure or ulcer, it must be treated by local applications of solutions of nitrate of silver daily, if the solutions are weak (from 1 to 3 per cent.); once in four or five days, if strong (10 per cent.). If there is a fistula, it should be incised or excised. If there is catarrh of the rectum, it may be treated by alkaline enemata.

In a few cases, which persistently resist milder forms of treatment, it has been proposed to excise the

ring of affected skin surrounding the anus. Some favorable results have been reported from this treatment, but it is generally considered as more severe than is necessary. Other surgeons have proposed to incise strips of skin, leaving other strips *in situ*, but passing the knife under these so entirely as to separate the nerves through which the sensation of itching is transmitted.

A considerable number of these patients have been treated with very gratifying results with the Roentgen ray. These applications may be given at first with two exposures a week, until some dermatitis is produced, and then once a week. The Roentgen ray causes a diminution of the excessive moisture which is sometimes present, and a decrease in the size of the sebaceous follicles, these seeming to be affected by the ray more than the sweat glands. Others have used the high-frequency current with asserted advantage.

LOCAL REMEDIES

Various local remedies are used with more or less success. A group of suggestive prescriptions will be found above. Many physicians advise the use of cocain, but this should never be given to the patient for personal use; it should only be used by the physician to relieve the pain of local applications, such as nitrate of silver, or for the performance of minor operations.

Before thinking of applying any remedy, a most scrupulous cleanliness should be exercised. After every movement of the bowels, the anal region should be bathed with hot water, which may be used without medication, or there may be dissolved in it simple salt, borax, or bicarbonate of sodium. The use of newspaper or other coarse paper should be strictly prohibited; indeed, some writers have expressed the opinion that the printers' ink on the newspapers is a frequent cause of this condition.

At such times as the itching comes on intensely, especially in the evening or after retiring, local applications either ice-cold or very hot water often afford considerable relief. The hot water may be medicated by the addition of boric acid to the point of saturation, or with

borax. Phenol (carbolic acid) may be applied in solution of from 2 to 3 per cent. strength, and it may be used in much stronger solution once or twice a week.

A very useful simple application, especially valuable in pruritus vulvae, is yeast. It may be applied as brewers' yeast; or, as satisfactory, is a solution of an ordinary tin-foil-covered yeast cake in a half pint or a pint of water. Daily applications of this yeast solution, especially at night, will sometimes cure when all else has failed.

PRURITUS VULVAE

All of the general remarks applicable to pruritus ani and perineal pruritus are equally applicable to pruritus vulvae. Irritating vaginal discharges should be ameliorated: the possibility of the presence of insects should be considered, and if they are present they should be removed.

Diabetes is a frequent cause of the trouble. Irritating, abnormal urine is another frequent cause; when this is corrected, or the vulva protected by bland ointments, the pruritus ceases. In one-sided, unaccountable and unexplainable pruritus, the Roentgen ray has effected a cure.

SCABIES

If the burrows and the itch mite are found, of course the diagnosis of scabies is readily made, but there are many cases of itch in which the burrows are difficult of discovery, and the itch mite is elusive and evades the dermal scrapings for microscopic examination. Even the itching varies with different individuals, some few being very tolerant of the irritation and thus becoming conveyors and transmitters of the disease without their personal knowledge.

Various types of skin irritation develop during the various stages of scabitic inflammation. There may be papules, vesicles, pustules and crusts. The severest itching is generally present at night, and especially on first retiring.

"The burrow or run is made by the female in the lower layers of the cornified epithelium of the skin." These burrows, or "roughened, curved furrows," occur most frequently on the anterior surfaces of the wrists and between the fingers. Sometimes these burrows are

simulated by dirt-filled lines in the epidermis. The diagnosis can generally then be made by shaving off the suspected epidermis with a scalpel, then laying the epithelial slice on a slide, adding a drop of glycerin, placing a cover glass over it and examining with a low power lens. If the eggs of the itch mite, or the mite itself, are found, the diagnosis is established.

When the fingers and hands do not show signs of this infection, signs may be discovered on the elbow tips, and on the nipples of women. When there is a generalization of the disease, characteristic signs and eruptions will be seen on the hands, wrists, axillary folds, abdomen, nates, in the popliteal spaces, and more or less on the genitals.

It should not be forgotten that the itch may be present in a mixed infection; in other words, there is more or less eczema from the irritations and scratchings, there may be nodular and suppurative processes, enlarged glands and syphilitic eruptions.

The disease does not seem to be acquired in ordinary social life, but is caught mostly in bed, from individual to individual, or by sleeping in an infected bed.

TREATMENT

The parasitocides most used in eradicating the itch are sulphur, betanaphthol, balsam of Peru and cresol.

The patient should be instructed to take a hot bath, using plenty of soap and thoroughly cleansing, perhaps with a soft nail brush, the parts where the parasites are mostly located. He should then anoint all parts of his body with the sulphur ointment prescribed, and should especially rub it into the parts most affected.

In mild cases of this disease thorough bathing and cleansing of the affected parts with strong alkaline soap, rubbing and dusting the rest of the body with washed sulphur, and then dusting the sheets of the bed with this dry sulphur, may cause an eradication of the disease without the necessity, discomfort and nastiness of ointments.

In more severe cases, sulphur is commonly employed as an ointment, 1 to 2 drams to the ounce, thoroughly rubbed in over the affected parts, the head alone being excepted. The ointment is well rubbed in at night, the

patient then donning a suit of woolen underwear which is not removed for from three to five nights, the duration of the treatment. Each night a new supply of ointment is rubbed in. At the end of the treatment the patient may bathe, but no bath need be taken between treatments.

SULPHUR

The official sulphur ointment contains 15 per cent. of sulphur, and is stronger than should generally be used, on account of the irritation and actual dermatitis that it may cause. Either one of the following may be preferable:

| | gm. or c.c. | | |
|---------------------------------------|-------------|----|--------|
| R Sulphuris loti..... | 10\| | or | ℥ iiss |
| Adipis benzoinati...q. s. ad. | 100\| |  | ℥ iii |
| M. Sig.: Use externally, as directed. | | | |

Or:

| | gm. or c.c. | | |
|---------------------------------------|-------------|----|-------|
| R Unguenti sulphuris..... | 50\| |  |  |
| Adipis benzoinati.....āā | 50\| | or | ℥ iss |
| M. Sig.: Use externally, as directed. | | | |

Or for use especially in children:

| | gm. or c.c. | | |
|-----------------------------|-------------|----|------|
| R Sulphuris sublimatis..... | \| |  |  |
| Balsami peruvianae.....āā | 2\| | or | ℥ ss |
| Adipis | 30\| |  | ℥ i |

RINGWORM: TINEA TRICHOPHYTINA

To two very different diseases the name "tinea" has been given: one is tinea favosa, which is caused by the *Achorion schönleinii*; the other is tinea trichophytina, which is caused by the vegetable parasitic fungus trichophyton. It is the latter to which the present remarks will be limited.

The effects of this fungus are usually divided into three subdivisions, according to the particular part of the body affected. When that part of the face on which the beard grows is affected, it is distinguished as tinea barbae, or ringworm of the beard, or barber's itch. When the hair of the scalp is affected, it is known as tinea tonsurans, or ringworm of the scalp. When other parts of the body are affected it is known as tinea circinata, or ringworm of the body. These three

varieties of the disease are also distinguished respectively as *tinea trichophytina barbae*, *tinea trichophytina capitis*, and *tinea trichophytina corporis*. The same remedies are applicable to the treatment of these three forms of the disease, but the location in which the lesion is found necessitates some difference in their mode of application.

The trichophyton fungus is found and grows in the epidermal layer of the skin. It penetrates into the hair follicles, and also into the root and body of the hair. Its presence in the latter locations renders the application of drugs for its destruction very difficult, and it is on this account that the affection of the hairy scalp and the beard is especially resistant to treatment.

There are several drugs which are useful in the treatment of the disease when they can be effectively applied. The most important are mercury, hyposulphite of sodium (*sodii thiosulphas*), tincture of iodine, and sulphur. When there are a few spots on the surface of the body, a useful application is the following:

| | gm. or c.c. | |
|---------------------------------|-------------|-----------|
| R Hydrargyri chloridi corrosivi | 10 | gr. ii |
| Glycerini | 5 | or flʒ ii |
| Aquae | ad 50 | flʒ ii |

M. Sig.: Shake, and rub thoroughly into the lesion, twice a day.

The application of this lotion, or in fact of any remedy, should be preceded by a thorough scrubbing of the affected parts with hot water and soap, preferably soft soap or green soap. When the patient is a young child, care should be exercised not to apply too strong a lotion and not to apply it to too extensive a portion of the body, for too liberal applications of strong mercurial lotions may cause mercurial poisoning.

Another very effective remedy for the trichophyton as well as for other vegetable parasitic growths is the hyposulphite of sodium. This may be used in the strength of 15 to 20 per cent. in water.

If one prefers to use an ointment — and ointments are often exceedingly useful because watery preparations do not easily penetrate the skin — an efficient ointment is the official *unguentum hydrargyri ammo-*

niati. This ointment is 10 per cent. in strength. If there are many spots of disease, or the skin is tender, it is well to dilute it with an equal part of lard or petroleum fat, as:

| | | |
|---------------------------------|-------------|---------|
| | gm. or c.c. | |
| R Unguenti hydrargyri ammoniati | 15\| |  |
| Adipis benzoinati..... | 15\| | or 3 ss |

M. Sig.: Apply to spots twice a day.

Sulphur may be used in ointment or lotion, but is not so efficient.

If the condition is chronic, and these washes and lotions do not prove effective, the patches may be painted with tincture of iodine. This may be repeated every day for several days until the inflammation becomes so great that the application causes objectionable discomfort.

Ointments containing chrysarobin or pyrogallol are effective, but should not often be used on account of the fact that they stain the skin and clothing, and sometimes cause considerable inflammation.

When the scalp is affected and the fungus has penetrated the hair follicles, it is often difficult to apply these remedies effectively. It is generally wise to cut the hair short, and even to shave the head. The hairs will usually be found broken, and it is generally desirable to remove as many of the hairs as possible before applying the remedy. The affected parts should then be thoroughly washed with soap and water, and lotions of corrosive sublimate or of the thiosulphate of sodium may be used.

In cases which prove resistant to other treatment, it is sometimes necessary to attempt a cure by producing an active inflammation of the affected part. This may be accomplished by painting the part with tincture of iodine, as has been already mentioned; or croton oil may be rubbed into the affected part; or the part may be painted with cantharidated collodion so as to produce a blister. This will often result in a rapid cure.

The Roentgen ray has been used as a germicidal application, and as a promotor of a mild dermatitis (often a forerunner of a cure) in all parts of the body, with frequent reports of success. The hair, if

the ray is used on hairy parts, falls out, but seems to generally soon return.

When the beard is affected, the removal of the hairs can generally be more thoroughly accomplished, and then the various applications already enumerated may be used.

Poultices have been suggested for the purpose of softening the skin and cleaning off the crusts, but they are generally undesirable, as the moist heat favors the growth of the fungus.

Foley (*Lancet*, Jan. 24, 1914) describes the following method which he believes is extremely effective: The diseased area is first washed with a strong solution of sodium bicarbonate and swabbed with spirit of ether to remove grease. It is then painted with tincture of iodine and sprayed immediately with ethyl chlorid until the integument gets china white. The deeper the disease process the longer the spray must be applied. In ringworm of the scalp three or four applications may be necessary, but on smooth surfaces one application usually suffices.

Hartzell has found the ointment suggested by Whitfield, which contains 3 per cent. of salicylic acid with 5 per cent. of benzoic acid, most effective; but, he says, it cannot be used, as Whitfield has pointed out, without some degree of caution in markedly inflammatory cases, as it occasionally produces considerable irritation.

These cases are often very obstinate, and treatment must sometimes be carried on, intermittently, for weeks. It often happens that an apparent cure results while a few of the fungi still remain in the skin without showing any evidence of their presence. Consequently, cases should be kept under observation for some time after cure is apparently complete, and if any evidence of a return of the disease appears, the treatment should be renewed.

This disease appears more frequently in children than in adults, and the growth of the fungus seems to be favored by high temperature and by moisture. The disease is contagious, and is readily passed from one individual to another. Where considerable numbers of people associate intimately together great care

should be observed to prevent one contracting the disease from another. The use of combs, brushes, towels and clothing by different individuals should be strictly forbidden, especially when the existence of a single case among a number of children, as for instance in a large family or in a school, is known. It seems likely that with the extension of medical inspection to children in the public schools and with sanitary barber shops, this disease will, in a few years, become exceedingly rare.

TINEA TONSURANS

Ringworm of the scalp or bearded portions of the body is ordinarily a stubborn condition to treat. There are two chief methods used in the treatment—the drug treatment and the Roentgen ray.

The Roentgen-ray treatment is of material aid in shortening the course of the disease. It produces epilation; it does not seem to kill the fungi but it may stimulate the skin to a healthy inflammatory process that aids in ridding it of the organisms. Such treatments should not, however, be undertaken by those not thoroughly conversant with the action of Roentgen rays, as the harm done by incautious use of the apparatus may be irremediable.

Freshwater (*Practitioner*, 1914, August, xciii, No. 2) advises the following adaptation of the older method of treating ringworm of the scalp and beard. The hair should be cut as short as possible for at least two inches around the affected area. A better plan is to shave the head all over. The head should be washed daily with green soft soap, or an antiseptic shampoo wash, such as,

| | gm. or c.c. | |
|------------------------|-------------|--------|
| R Thymolis | 1 | gr. xv |
| Saponis mollis..... | | or |
| Spt. vini rect.....ana | 30 | ℥ i |

This is allowed to remain some ten to fifteen minutes on the scalp before rinsing off. The hair around the edges of a patch, for at least 1 inch, should be pulled out; this prevents spreading by continuity. A good ointment to apply before and during the period of epilation, is

| | gm. or c.c. | |
|-----------------------|-------------|---------|
| R Cupri oleatis..... | 4 | 3 i |
| Hydrarg. oleatis..... | 1 66 | gr. xxv |
| Lanolini | | |
| Ol. olivae.....ana | 30 | 3 i |

The following prescriptions Freshwater has proved to be efficacious, and, he says, if persevered with, will ultimately lead to a cure:

| | gm. or c.c. | |
|------------------------|-------------|---------|
| R Acid. salicylic..... | 66 | gr. x |
| Sulphur. praecip..... | 2 | gr. xxx |
| Adipis | 30 | or 3 i |
| Fiat ung..... | | |

| | gm. or c.c. | |
|-------------------------|-------------|-------|
| R Sulphur | 4 | 3 i |
| Acid. Salicylic..... | | |
| Naphthol. | | |
| Hydrarg. Ammon. ....ana | 66 | gr. x |
| Lanolini | | |
| Paraffin Liq. ....ana | 30 | 3 i |
| Fiat ung. | | |

| | gm. or c.c. | |
|--------------------|-------------|---------|
| R Sulphur | 4 | 3 i |
| Acid. Carboli..... | 2 | or 3 ss |
| Lanolini | 20 | 3 v |
| Paraffin Liq. | 12 | 3 iii |
| Fiat ung. | | |

The following lotions are also serviceable:

| | gm. or c.c. | |
|--|-------------|--------------|
| R Liquoris formaldehydi, 40 per cent. | 6 | or 3 ii |
| Aquae | 25 | 3 i |
| | gm. or c.c. | |
| R Acid. Salicylic..... | 2 | 3 ss |
| Spt. Lavand. | 30 | or 3 i |
| R Acid. Sulphurous..... | 8 | 3 ii (fresh) |
| Aquae | 24 | 3 vi |
| R Acid. Picric. | 5 | gr. viii |
| Camphor. | 120 | or 3 iv |
| Spt. Vini Rect..... | 180 | 3 vi |

The lotion should be applied with a brush twice daily for a month, when in favorable cases the stumps will have fallen. In small chronic patches and in the small widely spread patches of a disseminated ringworm, the application of croton oil is a valuable form of treat-

ment. It is best combined with phenol (carbolic acid) or creosote.

| | gm. or c.c. | |
|-------------------------------|-------------|------------------|
| R Phenolis (Acidi Carbol.)... | 1 | Creosoti gr. xv |
| Ol. Croton. | 9 | Ol. Croton. ʒ ii |

| | gm. or c.c. | |
|-------------------------|-------------|--------|
| R Acidi Salicylici..... | 66 | gr. x |
| Ol. Lavandulae | | |
| Ol. Bergamoti | 33 | or ʒ v |
| Ol. Olivae .....ad | 30 | ʒ i |

TINEA CRURIS

This is a disease that frequently attacks in epidemic form the students of universities and preparatory schools. It occurs on the inner side of the thighs near the body, often spreading to the scrotum, to the abdomen, to the perineum, and to the buttocks. The hairs do not fall out, thus differing from the ringworm that attacks the scalp and other parts of the body. There is slight itching and burning, but the disease may go on for weeks and even months without very much disturbance to the patient. It does not tend to recovery, and will persist until properly treated. In fact, the treatments outlined by most of the books on skin diseases are tediously ineffectual, and the statement is often made that a cure of the disease requires weeks and even months of treatment. Consequently, ordinary treatments of this disease are so unsatisfactory as to be considered of no value.

The following treatment is one that is always effectual and always curative in a short space of time. In the first place, it must be impressed on the patient that reinfection readily and almost persistently occurs unless the greatest cleanliness of the underclothing and even trousers is inaugurated. Also, it is evidently transmitted from patient to patient from the closet seats. Dirty jock straps and suspensory bandages used in athletics are persistent transmitters of the disease. Therefore, clean clothing must be worn after all the washable clothing has been boiled and the trousers have been properly cleaned and properly ironed. Closets must be rendered aseptic by frequent corrosive sublimate baths.

TREATMENT

The patient should then be instructed to come to the office, bringing clean drawers and a clean shirt, so that after the antiseptic treatment he can put on clothing that is not infected. The different steps in the antiseptic process are:

1. The parts are all thoroughly cleansed with a soft brush or cotton, and liquid soap, and the skin for four or five inches distance from the infected areas should also be cleansed with this soap. The scrubbing should not be very severe, as the skin must not be broken and the epidermis not too severely removed.

2. The infected area should then be wiped over thoroughly with a 2.5 per cent. phenol solution. This will slightly anesthetize the parts to which the stronger antiseptic is to be applied.

3. A cotton swab is now wet with the official formaldehyd solution. This is then lightly swabbed over all the infected parts, which are kept wet for three minutes, provided the patient can stand the burning pain for this length of time. If there is an area that is especially red and inflamed and sensitive, this part may be swabbed with the next solution mentioned before the three minutes have elapsed.

4. The whole area to which the formaldehyd solution has been applied is now thoroughly washed with the 2.5 per cent. phenol solution. This quickly relieves the pain caused by the formaldehyd application.

5. After the burning pain has ceased, the skin is gently dried and talcum powder is dusted over it. The patient then dresses in his clean clothing and takes care that he does not come in contact with any infected garments, beds or closets.

6. After twenty-four hours the patient should report for observation. If severe irritation has been caused by the formaldehyd solution, a 2 per cent. phenol ointment should be applied. If there is not severe irritation or inflammation, the simple talcum dusting powder is to be freely used.

7. At the end of a week the patient is again examined, and if there are any recurrent small areas, which may happen at the margins of the affected region, these are again touched with the formaldehyd solution.

By the above treatment a cure may be expected immediately and certainly within two weeks. The success of the antiseptic treatment is certainly far in advance of the ordinary treatments of this inveterate disease.

The preparations advised are as follows:

| | gm. or c.c. | | |
|----------------------------|-------------|----|---------|
| R Phenolis liquefacti..... | 2\| | or | 3 ss |
| Aquam | 100\| |  | fl 3 iv |

M. Sig.: 2.5 per cent. carbolic acid solution.

| | gm. or c.c. | | |
|------------------------------|-------------|----|---------|
| R Liquoris formaldehydi..... | 100\| | or | fl 3 iv |

M. Sig.: Official formaldehyd solution.

| | gm. or c.c. | | |
|----------------------------|-------------|----|-----|
| R Phenolis liquefacti..... | 50\| | or | ℥ x |
| Petrolati | 25\| |  | 3 i |

M. Sig.: Apply externally as directed.

IMPETIGO CONTAGIOSA

Pus infection of the skin, usually of the staphylococcic type, is an exceedingly troublesome condition. Ammoniated mercury ointment is usually recommended for this condition. The official ointment contains 10 parts of white precipitate in 90 parts of benzoimated lard. Sutton has stated that this preparation is too strong for the most effective use and he finds an oily preparation better than a fatty preparation, viz.:

| | gm. or c.c. | | |
|-----------------------------|-------------|----|---------|
| R Hydrargyri ammoniati..... | 1\| | or | gr. xv |
| Olei olivae..... | 100\| |  | fl 3 iv |

M. Sig.: Shake well and apply freely several times a day.

If deemed advisable, compresses may be soaked in this solution and kept in place over the affected areas by means of bandages or adhesive plaster. In the hairy parts of the body, as in the beard, a continuous application for twenty-four hours of the above solution will loosen all crusts and allow the antiseptic to reach the germs of infection and will inhibit the spreading of the disease. Sutton finds such treatment renders a cure possible in a week, whereby with other treatments from two to four weeks are needed.

Unna (*Berl. Klin. Wchnschr.*, 1915, lii, p. 453) says: "No true pus coccus affection of the skin, no isolated furuncle, no felon, should be taken lightly. When any of these have lasted any time, true pus cocci are already installed in the neighboring apparently sound hair follicles, ready to start new impetigo or furuncles. They must be walled off from the rest of the skin with a rampart of coccus-destroying substances." For this he uses ichthyol, or an ichthyol or mercury-phenol plaster, or a zinc-sulphur-chalk-turpentine paste. Another formula contains 10 parts sulphur latum, 10 parts calcium carbonate and 80 parts zinc ointment.

Before applying any of these preparations he washes the lesions and after drying touches them lightly with concentrated phenol on the suppurating points and also the roots of the hair around the spot. In case of extensive pyoderma, all the pustules are opened and the entire body is rubbed long and thoroughly with soap. He states any soap will do except tar soap, which, he thinks, breeds folliculitis. All the pustules, then, and their environment, are covered with zinc paste and gauze as maceration of the skin from friction of any kind promotes spreading of the impetigo.

PSORIASIS

The cause of psoriasis has been variously attributed to an infectious nature, to errors in metabolism, to disease of the glands of internal secretion.

Spiethoff (*Med. Klinik.*, 1914, Nov. 8, x, p. 1664) in a discussion of various theories in regard to the origin of psoriasis, says that it is doubtful if any of them have conclusive weight. An inherited tendency seems evident in 5 or 6 per cent. of the cases, and anything causing internal disturbances is liable to aggravate the condition or bring on attacks, especially digestive disturbances, abuse of coffee, tobacco or alcohol, a diet too rich in albumin, or constitutional disease. When diabetes and glycosuria can be excluded, benefit is often derived from a vegetarian diet.

TREATMENT

In treating psoriasis, as has been mentioned, a vegetarian diet often yields marked improvement. As to

symptomatic measures, Spiethoff does not rank any very high except Roentgen exposures. These are peculiarly effectual in the old cases with tough infiltrations on the limbs and head. Among the internal remedies he thinks that arsenic seems to be the only one that is worth mentioning; he has never seen any effect from salvarsan. Patients with severe psoriasis, taking a course of salvarsan for syphilis, did not find that the medication had any influence on the psoriasis. Serotherapy is inconstant in its action, but he extols the benefit from venesection in cases with much itching. Withdrawing from 50 to 100 c.c. of blood, repeating this two days later, generally put an end to the itching in his experience with it.

Arsenic may be given in the form of Fowler's solution, three to ten minims, three times a day or as arsenous acid in pills. The Asiatic pill is frequently prescribed as follows:

| | gm. or c.c. | |
|--------------------------------|-------------|-----------|
| R Arseni trioxidi..... | 25 | gr. iv |
| Piperis | 2 50 | or gr. xl |
| Pulveris gentianae compositi.. | | |
| Glycerini | aa q. s. | |

M. et fac pilulas 100.

Sig.: Commence with one pill before each meal, and increase one pill every second day until the full physiologic effect is secured. Then decrease one pill a day every second day.

Arsenic should not be given when the eruption is active and increasing. When it has been given to full physiologic effect, as evidenced by pain in the stomach, nausea, vomiting, diarrhea, puffiness or redness of the eyes, albumin or blood in the urine, it should be stopped for a day or two.

The salicylates, alkalies and diuretics have also been recommended for internal use in psoriasis in some cases.

Recently the autogenous serum treatment of psoriasis has been highly advocated in this country by Gottheil of New York, and Fox, Ravogli and Willock have published reports showing almost complete failures with this method. However, in any condition as difficult of eradication as psoriasis, methods which have seemed to yield success in the hands of even a few

specialists may be worthy of trial. In this method from 80 to 100 c.c. of blood are withdrawn, usually from a vein at the bend of the elbow, and centrifuged as soon as it has clotted. From 25 to 45 c.c. are obtained in this way and immediately reinjected intravenously into the patient. The time taken by the procedure varies from three quarters of an hour to two hours. The procedure may be repeated several times over a fairly long period.

LOCAL TREATMENT

The scales may be removed by scraping with a sharp curet and washing with hot water and green soap. A stiff brush may be used. If the scales are hard and there is thickening a 5 per cent. salicylic acid ointment will aid in softening and removing them.

Chrysarobin is the remedy of chief reliance in removing the patches. It may be given in the following manner:

| | gm. or c.c. | |
|---|-------------|-----------|
| R Chrysarobini | 1 | or gr. xv |
| Liquoris guttae perchae (N. F.) | 10 | 3 iii |
| M. Sig.: Apply at night, with a camel's hair brush. | | |
| Or: | | |

| | gm. or c.c. | |
|--|-------------|-----|
| R Chrysarobini | 3 | 3 i |
| Aetheris | | or |
| Alcoholis q. s. ad solutionem | | |
| Collodii | 25 | 3 i |
| M. Sig.: Apply at night with a camel's hair brush. | | |

Chrysarobin should not be used on the face and it should be remembered that the stains which it makes on clothing cannot be removed.

An ointment containing chrysarobin and salicylic acid (Dreuw's ointment) may be used over small areas on severely indurated lesions. The formula is:

| | gm. or c.c. | |
|-------------------------|-------------|---------|
| R Acidi salicylici..... | 10 | 3 iii |
| Chrysarobini | 20 | |
| Olei rusci..... | 20 | or 3 vi |
| (Oil of Birchwood) | | |
| Saponis mollis..... | 25 | |
| Petrolati | 25 | 3 i |

M. Sig.: "Rub in well, with a stiff brush, for five evenings. Then take hot baths on three successive evenings, using applications of olive oil in the meantime (to soften the skin). Repeat if necessary."

"When there are patches of psoriasis on the face or scalp only the white precipitate ointment should be used, as the chrysarobin is likely to give rise to severe erythema and edema in these regions."

It is best not to persist too long with any one remedy. Ammoniated mercury ointment, 5 to 10 per cent., may be of value, and ichthyol, tar, sulphur and beta-naphthol have likewise formed the chief ingredients of curative ointments.

BOILS (FURUNCLES)

The boil is usually a staphylococcic infection of the skin, beginning around a hair follicle, following an abrasion of the skin through friction from clothing, or otherwise. There seems to be no doubt that general furunculosis is associated with a lowering of the individual resistance to infection. Unna has described several ointments to be used in preventing the spread of these staphylococcal infections. These have been noted under the heading Impetigo.

The boil may sometimes be aborted by injecting into it, before it has pointed, a drop or two of a 5 to 10 per cent. solution of phenol, or by just touching its surface with 95 per cent. phenol and then covering the boil and the surrounding area with ichthyol ointment or a 5 to 10 per cent. salicylic acid ointment.

A 10 per cent. salicylic acid ointment may be made as follows:

| | gm. or c.c. | |
|--------------------------|-------------|---------|
| R. Acidi salicylici..... | 5\| | 3 iss |
| Unguenti | 50\| | or 3 ii |

M. Sig.: Use externally as directed.

Schüle (*Deut. med. Wchnschr.*, 1915, xl, p. 2023) declares that every furuncle can be aborted in the first forty-eight hours if the center is burnt out under local anesthesia with 2 per cent. novocain injected first to make a blister and then injected perpendicularly into the center of the boil. The actual cautery can then be used to burn out the center or merely a knitting needle can be used, heated red hot in an alcohol flame. The knitting needle can be stuck through a cork for a handle. To prevent further furuncles developing the skin should be cleansed with soap, rubbed with alcohol

and any suspicious looking points painted with tincture of iodine, burning out the center if a furuncle does develop. Even with a fully developed furuncle he advocates burning out the center plug in this way rather than to incise. The hyperemia thus induced aids in warding off new infection.

The above treatment is perhaps somewhat radical. The following has also been advised: The inflamed part should be thoroughly scrubbed with soap and water, then washed off with 50 per cent. alcohol, and then an alcohol compress should be applied to the part and allowed to remain until the alcohol has evaporated. The region is then again washed with soap and water and the suds allowed to dry on, no other dressing being applied. If there is no pus, a single treatment is said to abort the furuncle.

If the boil has already pointed, it should be evacuated, ordinarily by a crucial incision down through the plug. Anesthesia may be obtained by spraying with ether or ethyl chlorid. Carbuncles should be cut out entire under general anesthesia. The skin in the region of the boil should be washed with hydrogen peroxid or with mercuric chlorid solution (1:1,000 or 1:2,000) and then a cloth covered with 5 per cent. salicylic acid ointment may be applied.

Autogenous vaccines have been much used when furuncles recur repeatedly or in crops. There seems to be sufficient warrant for their use with good hope of preventing recurrences.

Needless to state, the recurrence of furuncles should be a signal to make thorough examination of the urine as to the presence of sugar, indicating diabetes.

ALOPECIA: BALDNESS

Several different forms of this condition have been described, of which the following are the types:

Alopecia congenitalia is an exceedingly rare condition in which a child is born without any hair. Microscopic examination of the skin in some cases shows an entire absence of follicles. In other cases the follicles are present, and after weeks, months, or possibly two or three years, the hair grows, although it is usually finer and thinner than in the average child of the same age.

Another variety is *alopecia senilis*, in which the loss of hair is an accompaniment and an indication of the general atrophy of the tissues throughout the entire body.

There is the disease called *alopecia areata*, which is characterized by a complete falling of hair from limited areas of the scalp or other hairy portion of the body. This is a distinct disease, and will not be considered in this connection.

There remains the form of *alopecia prematura*, in which the patient loses more or less of the hair to which he has become accustomed, but in which this loss is not associated with the changes characteristic of old age. This form of premature baldness is customarily divided into two classes: the idiopathic and symptomatic. In the idiopathic form few causes can be found for the occurrence, while in the symptomatic form there will be found some pathologic condition of the scalp, or some disease which has affected the general nutrition of the entire body. Under the latter head may be included the falling of the hair which so frequently follows typhoid fever, and which has recently been discussed at some length in this department. Omitting at the present time a discussion of the other forms of alopecia, a few words will be said regarding the common form of premature alopecia.

The most that can be said of premature baldness, according to *The Journal of the American Medical Association* (March 20, 1915, p. 1018), is that it is senile baldness coming on before the usual time. Of its causes we know actually nothing. We do, however, know the sequence of events.

Between the skin of the scalp and the skull there is a thick layer of fat to which the skin is loosely attached and on which it is freely movable. In civilized man, who lives in houses and wears hats, the following changes take place as he approaches later life: This fat layer gets thinner; the scalp becomes more firmly attached to the skull and less movable; the skin becomes more tense, and with these changes the hair becomes thinner and thinner over the top of the head. Finally, in extreme cases, the hair disappears and there is left a bald, glistening crown closely drawn over the

skull. This sad picture is senile, spontaneous or simple baldness. Premature baldness is the same thing, only occurring before the age when these changes, which we ordinarily attribute to old age, are expected to appear.

What is the process that has taken place here? There has been a disappearance in great part of the subcutaneous fat; the scalp has become much more dense in structure—has become fibrous or sclerotic—and with this shrinking in the scalp there has been a gradual shrinkage in the hair follicles until they entirely disappear, and are replaced by fibrous tissue. It is a process much like that taking place in many of the tissues in later life, and in some of the organs often as a result of disease. It resembles closely, for example, the destruction of the epithelial tubules in the kidneys that takes place as a result of chronic inflammatory processes. And it is a process that can readily be explained as a result of a chronic inflammatory process in the scalp. This is a reason for one view that all so-called senile baldness is really due to dandruff or seborrheic dermatitis. The sounder view seems to be that the change may be simply one of senile atrophy occurring as a primary process and not secondary to any diseased condition of the scalp.

The explanation of the fact that baldness is usually confined to the top of the head probably is that the increased tension of the scalp resulting from its shrinkage exerts its chief pressure on the top of the head. If one pulled a bag tightly down over the head it would exert much more pressure on the top of the head than around the border.

Simple or senile baldness, in spite of its name, usually begins to manifest itself early. The thinning of the hair becomes apparent before the age of 30 in 80 per cent of the cases, and persons who are not nearly bald at 50 are likely to keep a passable covering of hair until they reach old age.

The definite causes of simple baldness are uncertain, and there is much room for speculation. As a result, all sorts of factors are invoked to explain it, from the wearing of tight hats to improper methods of breathing. Some would go so far as to say that there is no such

thing and to attribute all of the cases to seborrheic dermatitis. This is an extreme view; but certainly the ravages of dandruff have to be taken into account in all cases of baldness, and in considering the causes of the condition, no separation can be made between simple baldness and that due to dandruff.

Baldness is much commoner in men than in women. This is true, however, only of complete baldness; thinning of the hair as a result of nervousness and other depressing influences on the health is commoner, perhaps, in women than in men. The reasons for the occurrence of baldness less frequently in women than in men are probably various. In the first place, women give much more attention to the toilet of the hair—to brushing it, and keeping it clean and in good condition; their hats are light things that merely rest on the hair, and finally, the fat layer of the scalp, as of the skin generally, is more abundant in women than in men and atrophies later in life. Man sometimes is inclined to have it that baldness is a sign of intelligence and a result of mental labor and that that is the reason it is commoner in men. This fiction is one of the few consolations that can be urged for the condition, and it seems mean to disturb it, but, truth to tell, there is no ground for it. Baldness may make one look wiser, but it occurs indifferently in the great and small, and it is no more a sign of wisdom than long hair is of genius.

The broad fact seems to be that in the common occurrence of baldness we have a manifestation of a transitional stage in man's evolution. The hair on the body now is the vestige of a former abundant coat. In the economy of nature, structures atrophy and disappear when they cease to have function, and the need of warmth and other protection afforded by the hair is no longer of great importance to man. Man now uses a hat instead of relying for protection for his head on a shock of hair as his ancestors did, and, as a result, in spite of all his coaxing, the shock of hair is gradually vanishing. This does not mean that you and I can save our hair by discarding our hats. We are result of our ancestors, and to save our hair we would have to discard the hats of all our ancestors for scores of generations back.

According to this view, heredity is one of the great causes of baldness, and all statistics indicate that this is true. In the statistics of Jackson and of White, the condition is due to heredity in from 30 to 40 per cent. of the cases.

Mistreatment of the hair is also an important factor in the production of baldness. Daily wetting of the hair, especially if no attention is given to drying it, keeping it poor in oil by excessive use of soap and water without supplying any fat in place of that removed, failure to keep it clean, excessive exposure to sunlight, the indiscriminate use of drugs, particularly "hair tonics," and overzealous treatment by barbers and hairdressers—all of these causes are influential in the production of baldness, and are to be guarded against, particularly in the care of hair of those who have already a predisposition to the condition.

The effects of heavy and tight hats by interfering with the circulation of the scalp is considered to be of great importance, and there can be little doubt that it is a factor to be considered. Hats should be light. They should provide for circulation of air, and should not bind the head. It can at least be said for women's hats that usually they are better in these respects than men's.

But after all other factors have been considered, we must still come back to seborrheic dermatitis—dandruff—as the most important cause, and the one to which most care must be given in preventing baldness. According to White's statistics, it is a factor, and perhaps the chief factor, in 79 per cent. of the cases; according to Jackson's, in 72 per cent., and according to Elliot's in 91 per cent.

PROPHYLAXIS

It is apparently little considered by the average individual that the hair should receive as particular care as do the teeth and nails. To be sure, it is the custom of most people to comb their hair, but this is generally done for the cosmetic rather than for hygienic effect. By improper care of the hair great harm may be done, and conversely, people who desire to preserve their

hair in good condition should take pains to encourage its healthy growth. Many people overdo the matter of making applications to the scalp, applying strong alcoholic preparations or other so-called tonics too frequently. Others, with an excess of pains, bathe it too frequently, especially with cold water, as is the case with people who take a daily cold shower bath. Others indulge too frequently in the luxury of a shampoo. While occasional washing of the hair is beneficial, too frequent application of water to the hair does harm by withdrawing the natural oil from the hair and scalp. The best authorities advise shampooing the scalp not more frequently than once a week and not less frequently than once a month. Probably nothing better can be used on these occasions than Castile soap and warm water.

With women, the case is somewhat different, but they have their special unhygienic practices which must be mentioned and condemned, especially the curling of the hair by winding it about hot curling-irons or doing it up in curl-papers over night.

In women, if hair is found to be cracking at the ends and becoming thin and unhealthy, the ends should be cut off.

The popular remedies to prevent falling of the hair would fill an encyclopedia. Vibratory and electrical treatments, hair tonics that feed the hair roots, as though they grew out of the scalp like broom-sedge out of an old field, neat's-foot oil and crude kerosene, massage and mange cures, all have their futile trials. Among them must also be included a method highly recommended by many barbers and beauty specialists, namely, singeing the hair. This is recommended to overcome splitting at the ends and to prevent falling of the hair, the reason for the latter being that it "closes the pores and keeps the fluid in the hair." With the long hair of a woman which has a tendency to split at the ends, it is possible that singeing the tips may be of some use; it substitutes a charred blunt end of fused horn for one tapering to a point or cut clean across. But even in cases of this sort it is less useful than greasing lightly the hair and thus supplying the at which is lacking in such hair. For the hair of

men, which is kept short, singeing is not of any use in preventing the splitting; hair which is not allowed to grow to its natural length does not split, unless it has a deep-seated disturbance for which there is no such simple remedy. Of course singeing the hair-ends in order to prevent the fluid in the hair from escaping, like sap from a tree, is based on an entire misconception of the hair's structure and nutrition. The hair does not contain any more sap than a buggy whip; it is not nourished by any fluid in it, but by the blood plasma that reaches only the hair root. The hair above the skin surface is a spine of horn, which is even oiled from without, and singeing its tips has no effect whatever on either its nourishment or its growth. It is certain that singeing the hair is of no value in preventing its fall; in fact the only value the procedure has is to the zealous hairdresser who gets his little fee for doing it — unless it is worth a quarter to the seeker after hair to think he is doing something, even if he is not.

TREATMENT

The treatment of baldness, whether due to a local inflammation of the scalp or to the result of some general disturbance of nutrition, is a somewhat puzzling matter. The treatment adopted must be continued for several weeks or even months before a result of much importance can be observed. Obviously at first the constitutional condition of the patient should be carefully inquired into, and any disturbance of it should be promptly remedied. If care and worry are apparently important factors in the disease, these should be remedied as far as possible. If the digestion is not properly performed, measures should be adopted which will correct it.

Certain internal remedies have appeared to have some control over the nutrition of the skin and scalp. Perhaps none surpasses arsenic in this respect, and in many cases the use of this drug will seem to contribute to a favorable result. If anemia is present, iron may be combined with arsenic. For instance:

| | | |
|------------------------------|-------------|---------|
| | gm. or c.c. | |
| R Arseni trioxidi..... | 104 | gr. ½ |
| Massae ferri carbonatis..... | 2 | or 3 ss |
| M. et fac pilulas 20. | | |

Sig.: Take one pill, three times a day, after meals.

Another drug which has appeared to have a selective action on the skin and scalp is sulphur, and in some cases this drug has been given with benefit, especially if there is constipation, or if there is observed a tendency to suppurative inflammation of the skin.

The question of local applications to the scalp is one which must be approached with some hesitation. The variety of drugs which have been recommended for application to the scalp to stimulate the growth of the hair is so great that one naturally feels suspicious in regard to the value of any one. This, however, must not discourage the physician from trying to select a suitable one which will prove of benefit to his patient. If dandruff is abundant on the scalp, one of the simplest applications is a solution of borax, with glycerin and water.

| | gm. or c.c. | |
|----------------------|-------------|-----------|
| R Sodii boratis..... | 4 | 3 i |
| Glycerini | 25 | or fl 3 v |
| Aquam | ad 200 | fl 3 vi |

M. Sig.: Shake, and apply externally twice a day.

This, like all applications designed for use on the scalp or for the purpose of stimulating the growth of the hair, should be applied to the scalp and not to the hair. This may be accomplished by using a comb to part the hair, separating it so that the application may be made directly to the scalp, and when the application has been made along one part, making successive applications along other parts, until the application has been made over the entire scalp.

Another remedy which has been extensively used for the relief of dandruff is resorcin. This may be used in the form of either a lotion or an ointment.

| | gm. or c.c. | |
|----------------------|-------------|-------------|
| R Resorcinolis | 6 | 3 iss |
| Alcoholis | 75 | or fl 3 iii |
| Aquam | ad 200 | fl 3 viii |

M. Sig.: Shake and apply to the scalp twice a day.

Or:

| | gm. or c.c. | |
|---------------------------|-------------|--------|
| R Resorcinol | 50 | gr. x |
| Adipis lanae hydrosi..... | 25 | or 5 i |

M. Sig.: Rub into the scalp twice a day..

These remedies are especially useful when there is any evidence of inflammatory action in the scalp because of their soothing and anti-inflammatory action. In these cases remedies which are stimulating should be avoided. If there is no evident pathologic process going on in the skin except the falling of the hair, more stimulating remedies may be applied. Of these the most important are alcohol, quinin, cantharides, and ammonia. These, with resorcin, which has been already mentioned, are the fundamental ingredients of most popular hair tonics. Bay rum, a favorite application to the hair with many people, owes its pleasant effect largely to the alcohol contained in it.

The tincture of cantharides is often combined with alcohol and castor oil as in the following prescription:

| | gm. or c.c. | | |
|------------------------------|-------------|----|---------|
| ½ Tincturae cantharidis..... | 10 | or | flʒ iii |
| Olei ricini..... | 5 | | flʒ iss |
| Alcoholis .....q. s. ad | 100 | | flʒ iv |

M. Sig.: Apply externally.

When corrosive sublimate is used the proper strength is half a grain to an ounce (0.03 gm. to 30 c.c.) of alcohol.

Ammonia may be used, as in the following prescription of Erasmus Wilson:

| | gm. or c.c. | | |
|------------------------------|-------------|----|---------|
| R Aquae ammoniae fortioris.. | 10 | or | |
| Chloroformi | 10 | | |
| Olei amygdalae expressi...āā | 10 | | flʒ iii |
| Olei limonis..... | 3 | | flʒ i |
| Alcoholis .....q. s. ad | 100 | | flʒ iv |

M. Sig.: Apply by dabbing on the scalp with a small piece of cloth, but not with friction.

The hydrochlorid of pilocarpin may be used in the form of an ointment:

| | gm. or c.c. | | |
|---------------------------------|-------------|----|--------|
| R Pilocarpini hydrochloridi.... | 1 | or | gr. xv |
| Olei lavendulae..... | 1 | | ℥ xv |
| Petrolati | 10 | | ʒ iii |
| Adipis lanae hydrosi..... | 30 | | ʒ i |

M. Sig.: Use externally.

A sulphur ointment may sometimes be used with advantage.

Dore (*Clin. Jour.*, 1914, xliii, No. 3) believes that in seborrheic cases, resorcin, salicylic acid, mercuric chlorid, sulphur and tar are the best drugs. In the majority of cases he uses a lotion such as the following:

| | gm. or c.c. | |
|----------------------------------|-------------|-----------|
| R Hydrarg. chloridi corrosivi.. | 03—.12 | gr. ss—ij |
| Resorcini vel acidi salicylici.. | 30—.60 | gr. v—x |
| Olei lavand. | 06—.12 | ℥ i—ij |
| Olei ricini vel glycerini..... | 30—.60 | ℥ v—x |
| Spt. vini rect.....ad 30 | | ℥ j |

If the scalp is dry the castor oil may be increased in quantity; if excessively greasy a solvent of fat such as ether or acetone may be added.

A spirit lotion is, he states, the best dressing for the hair of women; in men, water or weak spirit with glycerin instead of castor oil is sometimes preferable. Resorcin discolors white or very fair hair and salicylic acid should then be substituted. In severe cases an ointment may be required at first and may be rubbed in every night and washed off in the morning, or a small quantity applied once or twice a week after shampooing, that is:

| | gm. or c.c. | |
|----------------------|-------------|----------|
| R Naphthol β..... | 30—.60 | gr. v—x |
| Sulph. praecip. | 60—1.20 | gr. x—xx |
| Resorcini | 60—1.20 | gr. x—xx |
| Ol. lavand. | 06—.12 | ℥ i—ij |
| Vasellini .....ad 30 | | ℥ j |

To this oil of cade, etc., may be added.

When seborrhea is not a marked feature, as in toxic and nervous cases, pilocarpin may be substituted for the mercuric chlorid in the first prescription or prescribed with ammonia or other stimulant, that is:

| | gm. or c.c. | |
|----------------------------|-------------|--------|
| R Pilocarpini nitrat. | 30 | gr. v |
| Liq. ammon. fort. | 4 | ℥ j |
| Tinct. lavand. comp..... | 4 | ℥ j |
| Spt. vini rect..... | 50 | ℥ ii |
| Aquam .....ad 200 | | ℥ viii |

This lotion is also effective in slight degrees of seborrhea, because the ammonia forms a soap with the fat of the scalp. Other useful stimulants are chloral hydrate, acetic acid and cantharides; the last should be used with caution on account of its action on the

kidneys. Internal medication should not be forgotten, especially in neurotic and anemic cases and the glycerophosphates, cod-liver oil, iron, strychnin and arsenic are of service.

URTICARIA

The causes of simple urticaria are food (protein) poisoning, intestinal parasites, poisoning by certain drugs, disturbances of the liver or kidneys, gout, conditions associated with an increased amount of uric acid in the urine, constipation, an abnormally dry skin, and, in fact, anything that impedes normal elimination. Circulatory disturbances, especially when combined with high blood-pressure or arteriosclerosis, may be factors in causing urticarial eruptions.

Urticaria may occur, however, from almost any feverish condition or from any infection, and simply becomes, then, an added symptom. Most frequently urticaria is the most important symptom, and from its intense itching is the cause of the patient seeking medical advice.

The following treatment of simple urticaria has been suggested, namely, catharsis, a limited milk or cereal diet, large amounts of water, the administration of alkalies, such as potassium citrate in 2 gm. (30 grain) doses, given four or five times in twenty-four hours, or some other alkali, if preferred. Potassium citrate may be given as follows:

| | gm. or c.c. | |
|--------------------------|-------------|----------|
| R Potassii citratis..... | 50 | or ʒ ii |
| Aquae gaultheriae..... | 200 | flʒ viii |

M. Sig.: Two teaspoonfuls, in water, every four hours.

If it is known that the stomach and intestines have been irritated, bismuth subcarbonate and sodium bicarbonate should be administered, and, if the patient does not quickly recover, some form of calcium.

The patient should be kept cool. Thin and non-irritating underwear should be used. If the patient is a child or one in whom the condition tends to recur, linen or silk underwear should be worn. Warm baths, the water made alkaline with sodium bicarbonate, are soothing to urticarial patients, and will relieve the itching. The skin should not be rubbed, but should be mopped, lest the drying process cause irritation and

more itching. The localized spots may be sprayed with alcohol, cologne, or even mild acid applications, such as vinegar. Phenol solutions have long been used to dull the irritability of the peripheral nerves; a 2 per cent. solution, with or without glycerin often suffices, as:

| | gm. or c.c. | |
|----------------------------|-------------|----------|
| R Phenolis liquefacti..... | 4 | 3 i |
| Glycerini | 25 | or fl̄ i |
| Aquae menthae piperitae | | |
|q. s. ad 200 | | fl̄ viii |

M. Sig.: Use externally as a lotion.

[The preceding should be well shaken and should be labeled as poison.]

Sometimes such applications as "extract of witch-hazel" or a bland oil like almond oil will be soothing to the irritated skin. If the urticarial spots are not in large numbers, such application as camphor or chloral, with or without menthol, are often valuable, as:

| | gm. or c.c. | |
|-----------------------------|-------------|---------|
| R Camphorae | | |
| Chlorali hydrati.....āā | 2 | or 3 ss |
| Glycerini | 25 | fl̄ i |
| Alcoholis .....q. s. ad 100 | | fl̄ iv |

M. Sig.: Use externally. [Shake, and label as poison.]

| | gm. or c.c. | |
|-----------------------------|-------------|-----------|
| R Camphorae | | |
| Chlorali hydrati.....āā | 2 | 3 ss |
| Mentholis | 1 | or gr. xv |
| Glycerini | 25 | fl̄ i |
| Alcoholis .....q. s. ad 100 | | fl̄ iv |

M. Sig.: Use externally. [Shake, and label as poison.]

Various dusting powders are often of benefit, especially in children suffering from this condition. The simplest is powdered starch or a talcum powder. Sometimes stearate of zinc, with or without menthol, is of value as tending to adhere to the region that is irritated.

When urticaria continues or recurs, as it does occasionally in its milder forms, the whole physical condition, diet and personal hygiene, of the patient must be very carefully investigated. Some wrong condition will be found and when it is corrected the disturbance will disappear. Especially must the intestinal digestion be studied. If constipation or indigestion is present

measures to prevent the absorption of the irritants will generally cure the urticaria. Occasionally in young or older persons in whom a high tension or arteriosclerosis has begun or who have insufficient kidneys, conditions of the skin exist that cause temporary reddening, and perhaps itching, with the least irritation.

The skin may be so hypersensitive as to allow of what is termed "dermographia." This condition is a pseudo-urticaria, and the treatments that tend to relieve urticaria will generally relieve this condition.

When there are angioneurotic edemas, a diminution of the sodium chlorid in the food will often be a valuable adjunct to the other treatment inaugurated. This is especially true if the kidneys are at all insufficient.

Giant urticaria, on the other hand, is a serious, dangerous affection, especially if it attacks the face and mouth, as, when present, it is likely to do at any moment, and dangerous swelling in the throat and larynx may occur. This condition should be treated energetically, and the patient should be under close observation.

The treatment of giant urticaria is catharsis with calomel and saline cathartics; a milk diet, if milk agrees with the patient; or a plain water diet; or a cereal diet. Calcium should be given, and alkalies in large doses. Occasionally, large doses of quinin, such as 60 cg. (10 grains) twice a day, or good-sized doses of antipyrin, as 1 gm. (15 grains) three times a day, have seemed almost specific. Atropin pushed to physiologic action is sometimes of value. The exact cause of this serious condition has not been determined. Doubtless, however, it is anaphylactic and due to protein poisoning.

ROENTGEN DERMATITIS

The wide use of the Roentgen ray in the treatment of various diseases has led to the occurrence of Roentgen burns with dermatitis and severe rapidly growing new growths.

Caldwell, Abbe and others are convinced that the most practical, easiest applied treatment is the use of radium. The application of radium is free from pain and under its influence the lesions seem to retrogress. The effectiveness of the freezing methods and of the

electric-spark methods cannot be questioned, but they are both painful. Sparks can sometimes be applied in situations impossible to reach with liquid air or carbon-dioxid snow. Of the two methods, freezing is somewhat less painful. The value of surgery in such cases has been demonstrated beyond any shadow of doubt, but these operations are dangerous and they call for exceptional surgical judgment and technical skill. Under the best conditions excision cannot be safely done ordinarily without sacrificing healthy tissue. The possibility of hastening metastasis must always be considered.

Dodd has found the following application simple and efficacious in the treatment of the ordinary acute reaction following Roentgen-ray exposure:

| | gm. or c.c. | |
|--------------------|-------------|---------|
| R Zinci oxidi..... | 25 | 3 i |
| Phenolis | 2 | or 3 ss |
| Glycerini | 4 | 3 i |
| Aquae calcis..... | 200 | 3 viii |

Shake well and bathe area for five to ten minutes, twice or three times a day. Avoid all heavy dressings and, when possible, expose the lesion to the air. Do not apply this remedy on a dressing, and allow to remain for five to ten minutes, but sap it on and let the air get to the lesion. Under no conditions, he believes, should an ointment be used.

HYPERKERATOTIC ECZEMA OF PALMS AND SOLES

This type of eczema follows exposure of the hands to injurious influences such as rough weather, water, cleansing agents, chemical solutions and various traumatism, and the encasing of the feet in ill-fitting and deforming shoes, which produce callosities and breaking down of the arch, thereby increasing sweating of the soles and resulting in maceration of the keratotic, thick epithelium. In no other type of chronic eczema is local treatment more efficacious and more satisfactory, says Montgomery and Culver (*Jour. Cut. Dis.*, 1915, xxxiii, No. 5), than in hyperkeratotic eczema of the palms and soles.

Locally a plaster mull may be employed, containing 5 per cent. salicylic acid in soap plaster:

| | | |
|---|------------------------------------|--------------|
| R | Acidi salicylici..... | 5 per cent. |
| | Emplastri saponis (Beiersdorf).... | 95 per cent. |

This is applied on the fingers and covered with zinc oxid adhesive plaster, so as to intensify its action. This is changed once in twenty-four hours. Under its use the hard, concrete-like hyperkeratosis of the fingers melt down, and the skin becomes smooth and supple. This plaster cannot be applied to the feet as it would crumple up in walking, but an ointment may be prepared of about 12 per cent. salicylic acid in equal parts of lanolin and petrolatum, as follows:

| | gm. or c.c. | | |
|---|-----------------------|----|---------|
| R | Acidi salicylici..... | 8 | or 3 ii |
| | Lanolini | | |
| | Petrolati | 32 | 3 i |

This is applied in the morning, so that in walking it will be massaged into the skin. A few days later, when the patient is able to resume work, an ointment composed of one part of mercury in ninety-nine parts of simple ointment is used.

| | gm. or c.c. | | |
|---|---------------------------|----|-----------|
| R | Hydrarg. salicylatis..... | 1 | or gr. xv |
| | Ung. simplicis..... | 99 | 3 iv |

A salve composed of 6 per cent. each of red oxid of mercury and camphor and 12 per cent. of white lead, in an ointment base composed of equal parts of lanolin and petrolatum, may be used as follows:

| | gm. or c.c. | | |
|---|---------------------------|----|--------|
| R | Hydrarg. oxidi rubri..... | | |
| | Camphorae | 4 | 3 i |
| | Plumbi carbonatis..... | 4 | or 3 i |
| | Lanolini | | |
| | Petrolati | 32 | 3 i |

M. Sig.: Well rubbed in, twice a day.

In one case cited by Montgomery and Culver, after five weeks the daily applications were changed from the above to a lotion, consisting of:

- | | gm. or c.c. | | |
|--------------------------|-------------|----|--------|
| R Kali caustic..... | 15 | | gr. xx |
| Glycerini | 50 | or | ℥ ii |
| Spts. vini rect..... | 50 | | ℥ ii |
| Aquae rosae.....q. s. ad | 150 | | ℥ vi |
- M. Sig.: Local use, twice a day, before using a salve; and a salve consisting of:

- | | gm. or c.c. | | |
|-----------------------------|-------------|----|-------|
| R Hydrarg. salicylatis..... | 3 | | gr. v |
| Paraffin | 5 | or | ℥ iss |
| Petrolatum alb..... | 25 | | ℥ i |
- M. Sig.: Rub in twice a day.

Another patient sought treatment on account of a hyperkeratotic eczema of the fingers and right palm. He also had hyperidrosis, accompanied with light red erythema of both palms. A lotion was prescribed, consisting of:

- | | gm. or c.c. | | |
|--------------------------------|-------------|----|-------|
| R Liq. plumbi subacetatis..... | 16 | or | ℥ v |
| Liq. carbonis detergentis.... | 80 | | ℥ iii |
- M. Sig.: Two teaspoonfuls in pint of hot water as a lotion and apply as compresses for ten minutes, twice a day.

There was also prescribed an ointment:

- | | gm. or c.c. | | |
|---------------------------|-------------|----|---------|
| R Ichthyoli | 16 | | gr. xxv |
| Hydrarg. oxidi rubri..... | 4 | | ℥ i |
| Camphorae | 4 | or | ℥ i |
| Plumbi carbonatis..... | 8 | | ℥ ii |
| Lanolini | | | |
| Petrolati | 32 | | ℥ i |
- M. Sig.: Rub well into the lesions twice a day, after soaking the hands in the lotion.

Some time after this, the liquor carbonis detergentis was painted on in the full strength once a day, and the above dilute lotion of liquor carbonate detergentis and lead water was used only once a day, in the evening. The ointment was changed to one of:

- | | gm. or c.c. | | |
|--------------------------|-------------|----|--------|
| R Emplastri, plumbi..... | | | |
| Petrolati | 30 | or | ℥ i |
| Liq. cresol. com..... | 12 | | gr. xx |
- M. Sig.: Use on fingers twice a day.

Six weeks after beginning treatment his lesions had all disappeared. In a number of instances in which

other applications have failed, resorcin, in less than 4 per cent. strength, has been found excellent.

| | gm. or c.c. | |
|-----------------------|-------------|---------|
| R Resorcini | 2 | 3 ss |
| Glycerini | 2 | 3 ss |
| Zinci oxidi..... | 7 5 | or 3 ii |
| Cerae albae..... | 1 5 | gr. xx |
| Adipis benzoatis..... | 50 | 3 ii |

Dissolve the resorcin in heated glycerin. Melt together the wax and the lard, and add, while constantly stirring, the dissolved resorcin and the well-triturated oxid of zinc. Sig.: Rub in well, twice a day.

The official unguentum acidi borici often acts well; the white precipitate in 2 to 4 per cent. strength in an ointment, may, in some instances, be better than the salicylate of mercury as given in one of the above prescriptions. Some of the best results in treating eczema of the soles, and especially of the palms, have been obtained by Montgomery and Culver by the use of Roentgen rays, after all other lines of treatment have failed, for months or even years.

CHAPPED HANDS

The chief reason for chapping of the hands is the lack of fat in the skin in cold weather. Fat production in the skin is at a minimum in cold weather, because of the diminished sebaceous and sweat secretion. This and the dry air of winter make the skin dry and vulnerable at the very time when the cold air is itself irritating. This combination leads readily to chapping, if the hands must be exposed much to soap and water, and particularly if the irritation of antiseptics is added, as in the case of physicians and nurses.

The first thing to do to prevent or overcome the condition is to supply, by greasing the skin occasionally, the lacking fat in the skin. Almost any bland fat or semisolid hydrocarbon will do for this purpose, but nothing is better than a well-made cold cream. The next and more difficult thing to do is to avoid soap and water — especially soap — as much as possible; and it is here that hand lotions serve a very useful purpose.

Hand lotions are generally of two types: (1) glycerin solutions of the glycerin, rose water and benzoin kind, and (2) gelatinous liquids made with traga-

canth, quince seed, or some other water-soluble colloid. The glycerin lotions work well with some skins and are the most satisfactory to an occasional individual, but as a rule they are not the best, first, because the glycerin tends to make drier a skin already too dry, and, second, because these lotions have little or no detergent effect and do not clean the skin.

The tragacanth and quince seed lotions are better, and of these the tragacanth lotions are certainly as good as any other and are very cheap and easy to make. A formula for such a lotion given by Pusey is as follows:

| | gm. or c.c. | |
|----------------------|-------------|-------|
| R Tragacanth | 5 | 3 iss |
| Glycerin | 16 | 3 v |
| Boric acid..... | 16 | 3 v |
| Water .....q. s. | 1000 | Oi |
| Oil of bergamot..... | | ℥ iv |
| Oil of lavender..... | | ℥ ii |
| Oil of rose..... | | ℥ i |

The oils mentioned being added as a perfume might be omitted, one or all of them, according to the wish of the prescriber.

The boric acid, glycerin and waters are first mixed, the tragacanth added and the mixture agitated until the tragacanth is dissolved. This makes a rather thick mucilage; it can be changed to any consistency desired by slight increase or decrease in the amount of tragacanth.

A lotion like this has a considerable detergent effect; it is a tolerable substitute for soap, and if it is freely rubbed over the hands and wiped off, either with or without the use of water, cleans the skin of all but the most tenacious dirt. It, of course, cannot be effectually used as a complete substitute for soap. Such a lotion has the advantage over soap that it not only is not irritating to sensitive skin but also is bland and soothing. It thus tends to prevent and eventually to cure chapping of the hands.

CHILBLAIN

The conditions favoring chilblain are impaired and weak circulation. Hence it is seen chiefly in the lower extremities, especially in the feet, but may affect also

the fingers, ears, nose and cheeks, parts especially exposed to the cold.

The principal manifestations of the disorder are a burning heat, with itching and redness. These symptoms are usually worse at night.

Rapid change of temperature or prolonged exposure to cold, and especially to cold combined with dampness and moisture, undoubtedly produces slight histologic changes, of an inflammatory character, in the cutaneous structures. These have been designated by some writers as chronic erythematous dermatitis.

Relief is sometimes obtained by painting the affected part with tincture of iodine, or with equal parts of tincture of iodine and tincture of opium. Oil of peppermint diluted with from one to six parts of glycerin has been recommended as affording relief.

F. Gardiner of Edinburgh (*Practitioner*, February, 1908), recommends ichthyol, which may be used in the form of a 10 or 20 per cent. ointment with lanolin (*adepts lanae hydrosus*). This should be spread thickly on linen, and applied for several successive nights. It relieves the congestion, inflammation, burning and itching. He has also used with benefit the faradic and high-frequency currents of the Roentgen ray.

If the chilblain undergoes ulceration, the same author recommends the following ointment:

| | gm. or c.c. | |
|--|-------------|-------|
| R Hydrargyri ammoniati..... | 30 | gr. v |
| Ichthyol (ammonii sulpho- ichthyolatis) | 60 | ℥ x |
| Amyli | 8 | or |
| Zinci oxidi..... | 8 | 3 ii |
| Petrolati | 15 | 3 ss |

M. Sig.: Spread on linen and apply to part.

When the inflammation proves resistant to treatment, the possibility that the affection is something more serious than chilblain, perhaps either lupus erythematosus or Reynaud's disease, must be considered.

C. Ritter (*Münch. med. Wchnschr.*, May 7, 1907) reports 150 cases treated by Bier's method of artificial hyperemia. He finds that this acts best in acute cases

and in chronic cases occurring in fairly healthy persons. The action is always beneficial.

Hot air he finds to be most useful when the condition is of long standing.

The following simple combinations may be of benefit for chilblains, painful corns or bunions:

| | gm. or c.c. | |
|-----------------------|-------------|----------|
| R Tincturae opii..... | 15 | or fl̄ss |
| Tincturae iodi.....āā | | |

M. Sig.: Paint once daily over the painful part.

| | gm. or c.c. | |
|---------------------------|-------------|---------|
| R Mentholis | 1 | gr. xv |
| Methylis salicylatis..... | 8 | or 3 ii |
| Adipis lanae hydrosi..... | 25 | 3 vi |

M. Sig.: Apply a small quantity frequently, rubbing in until absorbed.

| | gm. or c.c. | |
|----------------------------|-------------|----------|
| R Camphorae | 1 50 | gr. xx |
| Balsami peruviani..... | 50 | gr. vii |
| Olei amygdalae dulcis..... | 10 | or 3 iii |
| Adipis lanae hydrosi..... | | |
| Aquae rosae.....āā | 25 | 3 i |

M. Sig.: Use externally.

FROSTBITE

If chilblain is regarded as a chronic affection generally due to the action of cold, frostbite may be regarded as an acute affection due to the action of cold. When a portion of the body not properly protected is exposed to intense or extreme cold the tissues become affected, and if the cold is sufficiently intense and the exposure is sufficiently prolonged the part becomes frozen. Individuals in whom the circulation is weak, and particularly the young, the old and the debilitated, are especially likely to suffer from intense cold. Likewise those parts in which the circulation is least active, and which are least protected by clothing, as the ears, hands and feet, are prone to suffer.

Different degrees of frostbite are recognized. In the slighter forms, the smaller arteries become contracted, the circulation becomes slow, and there is venous stasis. This is accompanied by a change in the various structures, and also in the blood contained in the vessels of the affected part.

If the cold is more intense or the exposure is more prolonged, vesicles and blisters or blebs, containing often sanguinolent fluid, form.

Finally, if the exposure is sufficiently severe and sufficiently prolonged, the entire part becomes congealed, and freezing and gangrene result.

Locally the part becomes cold, pale, or bluish, shrunken or wrinkled, and there is loss of sensation and diminution, or entire loss, of the power of motion.

Constitutional symptoms vary with the condition of the individual and the extent of the lesion. Loss of energy, fatigue and weakness are early symptoms. These may be followed by indisposition to continued exertion, difficulty of speech, delirium, coma, and death.

Mayo Robson (*Lancet*, Jan. 16, 1915, p. 118) emphasizes chiefly that in the treatment of frost-bite it is of the utmost importance to save as much of the injured extremities as possible, and as it is impossible to say how much of the damaged tissues will survive, immediate or early amputation is absolutely contraindicated. The best treatment at first is friction with snow or cold water in a cold room, the changes to a warmer atmosphere being gradually brought about. Frictions with turpentine and oil or with spirit and soap liniment are useful remedies in the early stage, and after the friction the limbs should be raised on pillows and swathed in cotton-wool, which can be held in position by bandages applied loosely so as to avoid any danger of constriction. If blisters form, or discoloration of the toes or other parts shows that gangrene is probable, the whole foot should be sterilized by rubbing with oil of turpentine to cleanse the skin or with spirit containing 1 in 500 biniodid of mercury, after which strips of sterilized double cyanid gauze should be applied between the toes and the same gauze made to cover the whole foot, which is then enveloped in sterilized cotton-wool. Any blisters — which will be found to contain dark blood stained fluid — should be snipped and carefully dried and dressed with the spirit and biniodid lotion. Painting with tincture of iodine would probably be quite as effectual, as an antiseptic, as the spirit and biniodid solution.

Every effort should be made to keep the parts dry and sterile, and if gangrene occurs the surgeon should on no account make too great haste to amputate, as the tissues adjoining the line of demarcation become more and more healthy and the line of granulation tissue between the dead and living tissues, if kept aseptic, gives rise to little discharge and can be kept aseptic by a daily dressing with the spirit solution. Ultimately, when it is seen what flaps of skin are available, the dry, shrivelled gangrenous parts can be removed and the bones severed at such points as will allow the flaps to be conveniently applied to make a good cover to the stump. Cases in which the gangrenous process has only involved the superficial layers of the skin, the separation of the necrosed part should be left to Nature and afterward skin grafting will be found useful. If as a result of neglect or the use of wet dressings the gangrene has assumed the moist variety and the wounds are infected, the spirit dressings will still be useful, and the foot should be well dusted with equal parts of zinc oxid and boric acid, so as to make every effort to convert the moist into dry necrosis, and thus to avoid general septic complications and the danger of the gangrene spreading.

LICHEN PLANUS

R. L. Sutton (*Jour. A. M. A.*, 1914, Jan. 17, lviv, p. 175) describes certain variant forms of lichen planus which might escape recognition by the practitioner. He also includes in his consideration certain conditions heretofore included in the lichen group, but which have little clinical and no histologic resemblance to the typical form. Probably the most frequent of the aberrant types are those with circular patches of closely grouped more or less typical papules. Much rarer are the annular forms from gradual extension from single large papules. A form rather common in England but rare elsewhere is the linear type, the lichen planus striatus of Crocker, in which a narrow fillet of the eruption often follows the course of the sciatic nerve. Sutton thinks the most plausible explanation of this type is that it is due to scratching or other linear injury of the skin and not to nervous

disturbance. The vesicular and bullous types of the disease are rare, but two cases are reported by Sutton, as is also a case of a type followed by atrophy. Other atypical types are the warty type, lichen planus hypertrophicus, lichen chronicus simplex (Vidal), which Sutton agrees with Brocq and Jacquet is a circumscribed pruritus with subsequent lichenification. It is one of the conditions mentioned as not being one of true lichen planus. The name prurigo nodularis has been given as a name for this condition and will probably be generally adopted.

In the treatment, besides the regular hygienic and nutritional measures, Sutton has found mercury, as originally recommended by Liveing, greatly superior to arsenic. It is best given intramuscularly in the gluteal region and the soluble form rather than the insoluble form is preferred. In the hypertrophic form it may be alternated about once in two weeks with arsenic, or, better, with arsenic and iron. Alkaline diuretics are often beneficial, but he has found salicylates worse than useless on account of the gastric irritation. Cooling antipruritic ointments which are also more or less curative, and a soothing, non-greasy application which the patient may use at will, are advisable. A cooling, antipruritic ointment, which is at the same time more or less curative, may be made as follows:

| | gm. or c.c. | |
|-------------------------------|-------------|----------|
| R Phenol | 5 | ℥ v-x |
| Menthol | 5 | gr. v-x |
| Ammoniated mercurial ointment | 10 | or 3 iii |
| Zinc oxid ointment..... | 10 | 3 iii |
| Anhydrous wool-fat..... | 20 | 3 vi |

Lime water, sufficient to saturate.

Make into an ointment. Apply freely two or three times daily.

In addition to an ointment, it is advisable to prescribe a soothing, non-greasy application which the patient may apply at will. One of the best is ordinary calamine lotion, to which has been added from 1 to 10 per cent. of Duhring's coal tar preparation:

| | gm. or c.c. | |
|--|-------------|-------|
| R Phenol | 1 | ℥ xv |
| Compound tincture of coal- tar (Duhring)..... | 5 | 3 iii |
| Zinc Oxid..... | | |
| Starch | | or |
| Powdered calamine..... | 20 | 3 vi |
| Glycerin | 10 | 3 iii |
| Water, sufficient to make... | 125 | 3 vi |

Mix. Shake and apply freely several times daily.

This mixture is as hot as it is efficient, but Sutton found it of value in many intensely pruritic conditions.

For the eradication of the thick, scaly patches in lichen planus hypertrophicus, numerous methods have been suggested, none of which are entirely satisfactory. Repeated freezing with Pusey's carbon dioxid snow often is beneficial, and Roentgen therapy in an erythema dose (one sufficient to give rise to an erythematous reaction) or less, constitutes a reliable aid. The long-continued application, under rubber or oiled silk, of ointments containing considerable percentages of salicylic acid and tar occasionally results in a cure.

No efficient plan for treatment of prurigo nodularis has yet been devised. For the relief of the itching Sutton finds Bronson's oil (phenol and solution potassium hydroxid, of each 1½ dram, linseed oil 1 ounce) serviceable, although destruction of the lesions by repeated deep freezing with carbon dioxid snow, he believes, is probably the best plan.

VACCINE THERAPY IN SKIN DISEASES

Gilchrist (*Jour. Cut. Dis.*, 1913, December, xxxi, p. 975) summarizes his experience with vaccine therapy in over 800 cases of cutaneous disease. His brilliant results, failures and average successes assumed equal proportions. He believes that whenever an organism can be obtained in pure culture from a case of skin disease, it is only proper that an autogenous vaccine should be used, especially if it is chronic or subacute; or, when the disease is acute, and it does not yield to the usual modes of treatment and becomes dangerous. It is still necessary to pay careful attention to diet, to the regular functions of the body, to other internal and external treatments, as well as the

application of Roentgen rays in some cases. Many infectious diseases of the skin do not require vaccines at all, as, for example, impetigo contagiosa, in which in the very large majority of the cases, local applications cause the lesions to disappear in a few days. Vaccines are of the greatest value in chronic or sub-acute and especially relapsing staphylococcic affections of the skin, where there is a lack of production of antibodies. Vaccines are of great value in the treatment of relapsing furunculosis, sycosis vulgaris, pustular dermatitis and folliculitis.

In the various forms of eczema the results vary, and Gilchrist says that if a case of pustular, weeping or vesicular eczema is chronic, or relapses, and does not yield rapidly to the usual treatment, then vaccines should be tried. In rosacea the treatment yielded some very marked results. In connection with acne vulgaris, vaccine therapy has proved to be of great value in the treatment. As the result of his experience in the treatment of about 400 cases of acne, Gilchrist finds that a stock *bacillus acne* vaccine made in the hospital laboratory is as efficacious as an autogenous one. Gilchrist has also used ointments made up with various skin organisms successfully. It appears as if a localized immunity was produced by the application of such ointments. The use of a filtrate from living organisms was tried with some success in three cases of blastomycosis. Filtrates from the staphylococci were also used in staphylococcic affections, but not with beneficial results.

Kreuscher (*Ill. Med. Jour.*, 1913, xxiv, December) reports good results from autogenous vaccine therapy in a number of cases of acne, furunculosis and carbuncles.

More recently Wolfsohn (*Mittel. a. d. Grenzgeb. Med. et Chir.*, 1914, xxvii, No. 1) has discussed the results of seven years' experience with this method. He believes that even the greatest skeptics must be convinced of the beneficial results in certain conditions. Still better results may be anticipated when the vaccine therapy is supplemented by other therapeutic methods, especially chemotherapy, and when the desired clinical reaction is realized with the least dan-

gers by utilizing vaccines made with the least possible injury of the antigen elements. He has applied vaccine therapy in thirty-four acne patients, and nine were not influenced in the least; nine were temporarily improved, and sixteen were completely cured of their long rebellious acne. No benefit was apparent in his twelve cases of postoperative osteomyelitis fistula, nor in six of mastitis, but his success in six cases of furunculosis in infants justifies further trials with small doses. Vaccine therapy to date has been applied in about 2,000 cases of furunculosis in adults, but the published records do not state whether the trouble was old and chronic in all the cases, while this alone calls for vaccine therapy. In his thirty-two cases the furunculosis had lasted from two to twenty years, and twelve of the patients were completely and twelve others partly cured. In eight others no influence from persevering vaccine therapy was apparent. The cure has persisted from one to three years to date. A polyvalent vaccine often proved effectual but autogenous vaccines were more reliable.

In only three of his fourteen cases of chronic eczema was a cure realized, and nine were entirely uninfluenced. His success surpassed all expectations in six cases of obstinate sinusitis in the accessory cavities of the nose. General streptococcus infection is less promising for vaccine therapy, and the treatment failed completely in his eight cases of erysipelas of the face and in four other points, but in two cases of erysipelas of the arm distinct benefit was apparent. Acute streptococcus affections contraindicate vaccine therapy, but it may help in the subacute and chronic cases, especially with scarlatinal complications and migrating erysipelas.

BORIC ACID IN SKIN DISEASES

Boric acid, according to Montgomery (*Jour. A. M. A.*, 1915, lxiv, p. 883), has a very extensive use in skin diseases but is almost always used as an adjuvant.

Acne.—An initiatory soaking with a hot boric acid solution is often of great benefit in the local treatment of acne. For this purpose it is desirable to apply the

solution hot and to use a large quantity of it, so that the heat will be retained for a considerable time. Three heaping tablespoonfuls of boric acid powder are added to the usual quantity of water used in washing — about 3 quarts. This makes approximately a 3 per cent solution. The patient should then sit, leaning over the bowl, and soak the face well with towels wrung out of the hot solution. As the solution grows cooler, more hot water may be added. It is often advantageous so to soak the face for ten or fifteen minutes. It softens the epithelium and acts as an excellent detergent, removing the grease and many of the microorganisms, and decidedly increases the efficiency of a resorcin or sulphur application.

Furuncle.—In the primary stage of active congestion in furuncles, Montgomery suggests that moist heat together with a nonirritating antiseptic are the topical therapeutic indications. These indications, he says, may be met by employing gauze dipped in hot saturated (4 per cent.) solution of boric acid, and enveloping with oil silk to retain the moisture and the heat. This is similar to a poultice, but is not so good, as it is not so bland and does not retain the heat so well; it, however, is often sufficient, and is easier to apply. An admirable poultice for this purpose is made by mixing boric acid powder with starch paste. The preparation of this will be taken up later.

Styes.—The stye is a form of furuncle of the eyelid. It has been pointed out that styes may be related to seborrhea of the scalp. In the treatment of styes, Montgomery orders persistent bathing and soaking for half an hour twice a day with warm saturated solution of boric acid, and after each soaking to rub in a salve of 1 per cent. red mercuric oxid in vaselin.

Suppurative folliculitis of the vibrissae of the nares is another pyogenic affection in which boric acid may be employed with advantage. This folliculitis is a most tantalizing affection, and is often combined with cracking of the mucous membrane at the anterior angle of the nares, constituting one of the causes of red nose. These lesions may also furnish a convenient entrance for the streptococci. An efficient manner of treating this folliculitis is to set before the patient a

tin cup of saturated solution of boric acid, kept hot by placing it over the flame of a spirit lamp. The patient takes pledgets of absorbent cotton, dips them in the hot solution, and pushes them into the affected nostril, repeating this during ten or fifteen minutes till the tissues are well softened, and the crusts softened and loosened. Calomel, 12 per cent., or xeroform, 12 per cent. in vaselin, is then well rubbed in. This procedure may be repeated two or three times a day. Care must be taken both to soak thoroughly and anoint the fossae behind the nose tip, as these hollows are a favorite residence for germs in this affection. Epilation may or may not be necessary.

Impetigo.—To remove the crusts in impetigo Montgomery applies to the lesions a boric acid starch poultice. The making of this poultice is a simple matter, but it is often the simple matters that are the most neglected. It is made in the following manner:

Take ordinary, common, lump, laundry starch and pulverize it. This pulverization is to be done before measuring. Dissolve one slightly heaping tablespoonful of the pulverized starch in two tablespoonfuls of cold water. Add to this one coffee cupful of boiling water, stirring rapidly until the mixture is a thick paste. To this paste add a tablespoonful of boric acid, free from lumps, and stir well until thoroughly mixed. Fold the warm jelly between layers of thin muslin or cheesecloth, and apply as hot as can be borne.

A good poultice should not be too thin or it will dry, nor too bulky, or it will run; it should be slightly less than a finger thick. In order to prevent the borders drying and sticking to the surface, they may be greased with vaselin, oil or zinc oxid ointment.

This poultice is not gummy like a linseed poultice, is cleaner looking and retains heat just as well. Besides the foregoing use, such a poultice has a multitude of applications, sometimes being employed hot, sometimes cold, as pointed out by Sabouraud.

When, by means of this poultice, the crusts are softened and loosened, they may be gently removed. This removal is often best accomplished by rubbing in a salve containing an appropriate antiseptic, such

as ammoniated mercury. The following ointment is an excellent one for the purpose:

| | gm. or c.c. | |
|-------------------------------|-------------|------|
| R Ung. hydrargyri ammoniati.. | 15\| | ℥ ss |
| Ung. zinci oxidi..... | 30\| | ℥ i |

M. Sig.: Use twice a day both to clean and dress the affected surface.

The real efficient antiseptic in the above is the ammoniated mercury, a remedy familiar to every skin clinic in which naturally streptococcic infections are among the daily visitors. The 10 per cent. ointment of the Pharmacopeia, however, is too stimulating, and the zinc oxid ointment both dilutes it and modifies its asperity.

As a general lotion for more widespread use in very scattered pyogenic infection of the skin, a saturated solution of boric acid in dilute alcohol serves admirably. It is harmless, it is clean and does not stain, and is not disagreeable in either appearance or odor, and because of the alcohol cutting the fat of the cutaneous surface, both the alcohol and the boric acid are permitted to act effectively as antiseptics.

Perleche.—In this infection of the mouths of infants, pledgets of cotton wet in warm boric solution should first be industriously sopped into the corners of the mouth where there is cracking and a characteristic grey veil-like covering. If possible, they should be drawn across the corners of the mouth saddlewise and left there. After this, the ointment of ammoniated mercury and zinc oxid above mentioned, should be rubbed in.

Paronychia.—In paronychia or felon, both as an abortive measure, and as an antiphlogistic antiseptic measure, a dressing of a combination of boric acid and liquor alumini acetici may do excellent service. A lotion is made of:

| | gm. or c.c. | |
|-----------------------------|-------------|--------|
| R Liq. alumini acetici..... | 30\| | ℥ i |
| Acid boric sol. sat..... | 300\| | ℥ ss x |

M. Sig.: Employ warm water to bathe the finger, and also as a wet dressing.

Gauze soaked in this solution is wrapped about the finger, and then an amply fitting rubber finger-stall is drawn over it and retained by a not too tight bandage.

Liquor alumini acetici is among the best of the mild antiseptics, and is gradually coming into favor in surgical clinics. It must be carefully prepared, and should be diluted about ten times. The water employed in its dilution is not an indifferent matter, as that containing carbonates throws down a heavy gelatinous precipitate of aluminum hydroxid. As the foregoing prescription is put up by a druggist, and with distilled water, this mischance is avoided.

Montgomery believes that used either alone or combined with other powders, boric acid is very valuable in many discharging diseases of the skin. An excellent powder is made of equal parts of boric acid and talc, or of equal parts of starch, zinc oxid and boric acid.

The boric acid ointment of the Pharmacopeia contains about 8 per cent. of boric acid, while Lister's ointment is much stronger — about 16 per cent. Boric acid ointment is an excellent nonirritating preparation with a multitude of uses. It is an ointment that, more generally than any other, is well prepared, and this is a point of importance when the druggist who is to put up a prescription is not known, as ointments are often wretchedly made. In seborrheic conditions this ointment will sometimes agree when those more usually employed fail.

PICRIC ACID IN SKIN DISEASES

Wilcox (*Archives of Pediatrics*, 1913, xxx, p. 877) believes that as an aid in the relief of discomfort in skin lesions as well as in their cure, picric acid has proved its worth. The drug is safe and easy to handle, the only drawback being the permanent staining of everything with which it comes in contact.

Eczema.—Better results were obtained in the acute than in the chronic eczemas; most striking was the improvement seen in the acute cases having profuse exudation, excoriation and crusting. In the milder cases an aqueous solution painted on several times daily and allowed to dry was used, while in the more severe cases wet dressings of picric acid were applied, held in place by a facial mask. Lessening of the itching and pain attendant on the inflammatory condition

was almost immediate. Reduction in the serous exudation and softening of the crusts were equally prompt. Improvement in the induration was rapid, as was the subsequent epithelialization. Such a rapid relief of the suffering attendant on this distressing condition was not obtained by any other means. Picric acid alone was not as efficacious in the subacute and chronic types of the disease; it was found, however, that the curing of the lesions was hastened materially by treatment initiated by two or three days' application of the picric acid solution. The effectiveness of the usual ointments, containing zinc, tar, salicylic acid, calomel, mercury, etc., was much greater than without this preliminary treatment.

Intertrigo.—Intertrigo was treated with picric acid. The solution was painted on the surfaces of the skin involved and they were kept from coming in contact by thin layers of absorbent cotton. In the more severely infected cases wet dressings were used. Cures were effected in about half the time taken on similar cases treated with ichthyol solutions. The use of picric acid in intertrigo was so satisfactory that a bottle of the aqueous solution is now part of the regular equipment of the dressing carriage, and the nurses, in the routine of changing the babies' napkins, apply it whenever the buttocks appear red or irritated.

Erysipelas.—Results in the treatment of erysipelas were not uniformly successful. In certain ways they were, however, more satisfactory than the results obtained by the use of any other method. The discomfort and pain attendant on the condition were relieved more quickly and the edema disappeared rapidly. In several cases, desquamation in cast-like masses followed the use of picric acid, leaving a healthy normal skin beneath. A reduction in the temperature of these patients was the rule, occurring with or without marked improvement in the local condition.

Herpes Labialis.—In herpes labialis a more rapid drying up of the lesion and fewer extensions of the trouble were obtained with picric acid than with any other method used. With the exception of immediate and constant relief from the itching, children suffering from psoriasis showed no particular response to

the treatment. In impetigo, better results were obtained with the use of antiseptic ointments than with picric acid washes. Picric acid ointments were not used on these cases.

TREATMENT OF PERSPIRING FEET

Excessive perspiration of the feet, while not an important ailment is one concerning which the physician is frequently consulted because of its persistent and disagreeable nature.

In the treatment of this condition the cautious use of the Roentgen ray is recommended as the best method of checking excessive perspiration. Among the local applications which may be used with benefit are tannic acid, alum or zinc sulphate in from 1 to 8 per cent. solutions (from 1 dram to 1 ounce to a pint of water). Another useful application is a 1 per cent. dilution of liquor formaldehydi in water. The parts should be washed and then bathed in one of these solutions for several minutes twice daily and afterward powdered with boric acid, with or without 1 or 2 per cent. salicylic acid.

BURNS

It is customary, following Hebra, to classify burns by three degrees. This classification is based on the extent of the pathology, varying from simple inflammatory reactions of the skin to a primary necrosis. In a recent review of the management of burns Ravogli (*Jour. A. M. A.*, July 24, 1915, p. 291) states that the best treatment is that which favors sloughing of the burned skin, maintains sterility of the resulting wound and promotes granulation and the forming of new epidermis.

In burns of the first degree Ravogli believes that the application of a dry powder, such as talcum, bismuth or burnt alum is the best treatment. Salves and baths are inadvisable because of the possibility of excoriation and maceration of the epidermis with secondary infection. When there is severe pain a compress moistened with a 2 to 5 per cent. solution of aluminum subacetate is applied to relieve the pain. As soon as the pain is relieved, the skin should be dried and a dry powder applied.

In second degree burns, as soon as the blisters are distended with serum they are evacuated, leaving the epidermis in place to protect the papillary layer. Compresses of aluminum subacetate are advised here also. The application of compresses moistened with 1 per cent. picric acid solution have been advised, and also a solution of potassium permanganate of 1:3,000 or 1:4,000. These solutions are difficult to handle and stain anything with which they come in contact. Over the compresses moist with aluminum subacetate a piece of oiled silk, cut to hold the dressing in place, is bound. This may be removed at intervals and the dressings again moistened. Such oily substances as carron oil, or oleum lini and aqua calcis may carry infection and should therefore be avoided. When the shreds of epidermis forming the blisters are easily detached they are removed with a forceps and scissors and the whole surface gradually cleared. The exposed surfaces may then be exposed to the air, for an hour at first, later for two or three hours. The surface is then covered with powder and sterile gauze. Little points which ooze and granulate are touched with 3 per cent. silver nitrate solution and are covered with 2 per cent. boric acid in petrolatum to prevent crusting. Under such treatment these burns heal in from ten days to two weeks.

In burns of the third degree practically the same treatment is used. If pus forms compresses of 1:2,000 mercuric chlorid solution are used until the lesion is clean and fever disappears. There is danger in too long continuing compresses of mercuric chlorid. After being exposed to the air for two or three hours when granulation has begun, Ravogli applies 2 per cent. borated petrolatum on English lint. When the granulations are pale and show a tendency to form pus, a mixture of castor oil and Peruvian balsam may be applied. If too long continued this dressing produces irritation.

In burns of large areas of the surface of the body, other methods of treatment are often necessary.

Kuss and others have advocated the covering of the burned area with a piece of caoutchouc paper in which

holes are cut. Through these the serum drains and the wound is moistened at intervals with salt solution.

Parker (*Jour. A. M. A.*, July 3, 1915, p. 16), after sloughing of the tissue has taken place, covers the wounds, or ulcers, especially in burns of the extremities, with strips of adhesive plaster.

After separation of the slough, ribbons of adhesive plaster from 1 to 1¼ inches wide and long enough to cover the area and lap over slightly are placed, leaving no granulations exposed. Its function is to keep in the serum and prevent cells dying from dryness. Over this are placed several layers of gauze to take up the secretion that works out between the strips at various places.

The gauze is changed every day as it becomes soiled and every few days the adhesive plaster. This is done by cutting through it with a blunt scissors when it immediately falls away from the moist surface to which it does not become attached. Pus comes away with it. The surface is sponged and a new dressing applied. Parker finds that burned areas so treated granulate smoothly, with little absorption of toxic products and but little pain to patients in changing dressings. Skin grafts placed under such dressings seem to grow as well or better than under gauze dressings.

GENERAL TREATMENT

As has been mentioned, over large, severely burned areas, Reverdin skin grafts may aid epidermization.

An extensive burn practically always is accompanied by some systemic reaction. Patients may be stimulated with caffein or strychnin, or morphin may be given to relieve the pain.

Gastroduodenal ulceration, with nausea, vomiting, and acute nephritis are not wholly unusual sequellae. In such cases alkalization of the patient, the use of Fisher's solution as mentioned under nephritis, and digitalis will aid in clearing up the condition.

As the patient improves, a good diet, plenty of open air and the administration of iron aid in improving the general condition.

DISEASES OF THE GENITO- URINARY TRACT

• ACUTE GONORRHEA

While, theoretically, the most sensible treatment in this unfortunate common disease would be to place the patient in bed, on a milk diet combined with bland alkaline drinks and free catharsis, it is obviously impossible, in the majority of instances, to carry out such treatment. Consequently it should be aimed to get as near as possible to such general treatment.

GENERAL TREATMENT

Exercise.—The patient should be forbidden all violent exercise. Running, swimming, dancing, gymnastics, and extreme exertion of any kind should be forbidden.

Suspensory.—Rest is obtained by the wearing of a suitable suspensory bandage. The organ should be straightened out and attached toward the abdomen. Ordinary suspensory bandages do not do this. The patient should be instructed to avoid sexual intercourse or various sexual excitants.

Diet.—All substances which may bring on constipation or excite the generative organs should be forbidden. Alcohol, coffee, tea, highly spiced foods and condiments, very acid or salty dishes, and various shellfish should be forbidden. The use of tobacco in small amounts by those habituated to its use may be continued, but excess is certainly contraindicated.

Cleanliness.—The patient should be instructed to maintain scrupulous cleanliness. The organ should be covered with a clean dressing after each micturition. The patient should avoid frequent handling of the genitalia. After such handling the hands should be washed thoroughly, and the eyes should not be touched because of the danger of transferring organisms and bringing on a gonorrheal conjunctivitis.

Fluids.—The patient should drink freely of water. One of the best methods of diminishing pain during micturition is to increase largely the quantity of urine. It may be necessary to influence the reaction of urine, making it either alkaline or acid as conditions indicate.

The best alkalinizers of the urine are the well-known potassium salts, the acetate, bicarbonate and citrate, and every physician has his favorite combination of these drugs. Any one of these salts is efficient if given in sufficient doses, though many physicians think a combination is better. The acetate is perhaps the most active alkali of the three, the bicarbonate the most disagreeable to take, and the citrate the pleasantest.

The urine is more readily rendered alkaline by the administration of the alkali directly after a meal, at which time the urine is the nearest to neutral on account of the production of hydrochloric acid in the stomach. The amount of an alkali that should be administered cannot be determined except by examination of the urine; in other words, if the object is to render the urine alkaline, enough should be given to cause that condition. Any of the following combinations are satisfactory:

| | gm. or c.c. | |
|--------------------------|-------------|----------|
| R Potassii citratis..... | 50\| | or ʒ ii |
| Aquae | 200\| | ñ ʒ viii |

M. Sig.: Two teaspoonfuls, in water, three times a day, after meals.

[The water may be flavored with an aromatic, as peppermint, spearmint, wintergreen, or cinnamon, if desired.]

. It will often be necessary to administer the above dose more frequently than three times a day. Also, as an adjunct it is sometimes advisable to have the patient drink several glasses of artificial or natural vichy, or some other alkaline water, during the day.

Or:

| | gm. or c.c. | |
|----------------------------|-------------|----------|
| R Potassii acetatis..... | 10\| |  |
| Potassii bicarbonatis..... | 10\| | ʒ iii |
| Potassii citratis..... | 20\| | or ʒ vi |
| Aquae cinnamomi..... | 200\| | ñ ʒ viii |

M. Sig.: Two teaspoonfuls, in water, three times a day, after meals.

Alkalies should not be pushed long if there is considerable mucus coming from the bladder, or if there

is bladder irritability, for it must be remembered that the bladder mucous membrane is accustomed to an acid secretion, and a continuous alkaline urine sooner or later causes irritability of the neck of the bladder, frequent micturition and even tenesmus. Also, if the urine becomes at all ammoniacal, the irritation of the bladder is made worse by alkalies, and the likelihood of deposits in the bladder is increased.

URINARY ANTISEPTICS

To render the urine antiseptic there are no better drugs than salol (phenylis salicylas) or hexamethylenamin.

As soon as the first acute symptoms are over, the alkali should be stopped, as it is not well for a healthy condition of the mucous membrane of the bladder to keep the urine alkaline for any considerable time. At this time it seems well to begin the administration of salol or hexamethylenamin, as thought best. If there is any irritation of the kidneys, salol, on account of one of its decomposition products being phenol, should not be used, phenol being irritant to the kidneys. If it is administered, it is well given as follows:

| | | |
|-----------------------------------|-------------|----------|
| | gm. or c.c. | |
| ℞ Phenylis salicylatis..... | 5\| | or 3 iss |
| Fac capsulas siccas, 20. | | |
| Sig.: A capsule every four hours. | | |

Hexamethylenamin, to be effective, must be given in acid medium, or no formaldehyd will be released, and its antiseptic action will be nullified. It may be given in a dosage of 5 grains three or four times a day in half a glass of water.

COPAIBA AND SANTAL

These drugs have long been used in gonorrhea for their action on the mucous membrane of the genital tract. They are indicated apparently for subacute and chronic gonorrhea rather than for the acute condition. As soon as posterior urethritis has developed, which occurs in the majority of cases of gonorrheal urethritis, one of the balsams is indicated, unless there is vesical irritation, as shown by great frequency of urination

with small amounts of urine passed. Santal oil seems to be one of the best preparations and may be administered as follows:

| | | |
|---|-------------|-----|
| | gm. or c.c. | |
| R Capsulas olei santali flexibiles...āā | \| | m x |
| No. 25. | | |

Sig.: A capsule three times a day, after meals.

If there is no diminution in the amount of pus in the second glass of the two-glass test, and there are no symptoms of over-action of santal wood (viz., no pains referred to the ureters, or lumbar pains, and no special indigestion), two of these capsules three times a day may be taken.

It should be emphasized that no patient with gonorrhea can be well treated unless at each office visit he passes urine, that has been retained for at least three hours, into two glasses, he dividing the amount as nearly equally as his judgment permits. The washout from the urethra can thus be examined in the first glass, and the urine from the bladder and posterior urethra be examined in the second glass, and the conclusions thus arrived at will many times decide the treatment that is needed.

All balsam treatment may be stopped as soon as the posterior urethritis is cured. If, on the other hand, the posterior urethritis does not improve, the balsam may be increased in amount, or, if the posterior urethritis tends to become chronic, local posterior urethral treatment is indicated. It is also wise to demonstrate to the patient that, although the anterior urethral discharge may have ceased, he is not well until the posterior urethra is healed.

New and Nonofficial Remedies contains the following preparations for this purpose: Arhéol is an alcohol which is the chief constituent of sandalwood oil. It is claimed that because of its purity it does not occasion disturbance of the stomach or the kidney. It is put up in capsules of which 9 to 12 are taken daily. Carbosant is the carbonic ester of santalol. It is put up in capsules containing 5 grs. each, of which two are given 3 times a day. Santyl is the salicylic acid ester of santalol, and thyresol is the methyl ether of antanol. These are but a few of the many prepara-

tions of this class. Most of those not included in New and Nonofficial Remedies are marketed with extravagant claims, some with suggestive names and literature leading to self-medication by the patient.

If it is preferred to use hexamethylenamin as a bladder and posterior urethra germicide treatment (and if the bladder becomes actually infected there probably is no better treatment), it may be given as follows:

| | | |
|---------------------------|-------------|----------|
| | gm. or c.c. | |
| R Hexamethylenaminæ | 6\| | or 3 iss |
| Fac chartulas, 20. | | |

Sig.: A powder, in a glass of water, four times a day.

LOCAL TREATMENT

The local treatment of gonorrhea involves the question of irrigations or injections. Pedersen does not believe that irrigation is often indicated in anterior urethritis. He believes that there are only "two indications that justify instrumentation of an acutely inflamed urethra, viz.: retention of urine not yielding to all the lesser means for its relief, and extremely severe posterior urethritis." It certainly appears not justifiable to give any great pressure to the delicate urethral membrane as occurs by any irrigation method. Such irrigations may not only force the gonococci into deeper tissues as well as into the posterior urethra and perhaps bladder, but may so injure the mucous membrane as to cause long protracted chronic inflammation and strictures.

On the other hand, Luys believes that in the vast majority of cases injections are badly done and lead to complications, such as prostatitis, cystitis and vesiculitis. To avoid these accidents the patient should not be given any syringe which holds more than 5 or 6 c.c. The patient should urinate before using the injection. The meatus and glands should be washed and the fluid injected first should be allowed to run out. The patient then reinjects, closes the meatus, holds the fluid five minutes and then allows it to run out.

The number of substances used for such injections is legion; chief, however, are silver nitrate and the organic silver preparations. Silver nitrate is used in a strength of 1:1,000.

The silver compounds that may be used for this purpose are albargin, argentamin, argonin, argyrol, hegonon, novargon, protargol, sophol, cargentos, collargol and electrargol. All of these preparations are included in New and Nonofficial Remedies. The strength of the solution used varies with the preparation, argyrol from 5 to 20 per cent., protargyrol, 1 to 2 per cent., etc.

The patient, as has been stated, should be carefully instructed first how to pass the urine and then how to use the syringe and how to retain the fluid. The length of time that he should retain it depends on the length of time that there is burning after the injection has been evacuated. If the burning lasts a considerable time, the injection should be retained a shorter time. Unless there is a contraindication of much pain and burning, the retention of the silver solution for five minutes, and perhaps longer, is certainly more likely to allow the germicide to penetrate more deeply.

The injection may be used every three hours for the first twenty-four hours, and every four hours thereafter. Every fourth day at least a smear of the discharge should be examined for the presence of gonococci. As they diminish in number the strength of the fluid is reduced and the frequency of its injection is diminished from four times daily to only twice daily.

After the organisms have disappeared from the discharge for from three to seven days the injection is reduced to once a day, and from five to ten days later it is discontinued altogether.

This frequent injection of the urethra would seem a little strenuous for the patient, and might need to be modified if it had caused much swelling and inflammation. As mentioned under the section on physical therapy, hydrotherapy in the form of hot applications and hot sitz baths may give relief if much inflammation or irritation is present.

IRRIGATIONS

This method of treatment is more common on the continent than in this country. The number of drugs used for this purpose also embraces almost every drug of antiseptic nature in the pharmacopeia and elsewhere.

According to Luys the chief and only contraindication is an acute local painful condition. Among the drugs used the principal ones are the silver salts, mercurial salts, potassium permanganate and bismuth salts. Very dilute solutions should be used to start. The water should be warm, distilled water. The technic of giving such irrigations is difficult, though simple, and should be thoroughly understood before it is attempted. The solution is placed in an irrigation douche-vessel which is fixed at a height of from three to five feet above the patient. The cannula is attached to a long tube leading from this vessel and there should be a stopcock to control the flow. The patient urinates, and lies prone. The genitalia are cleaned with an antiseptic solution and a basin is placed to catch overflow. The glans is held with the left hand and the meatus held apart. The cannula is introduced. At first the anterior urethra is irrigated. The cannula being withdrawn and the fluid allowed to run out. The cannula is again introduced, the meatus closed against it and the patient instructed to bear down as though to urinate. The fluid then enters the bladder and posterior urethra. It is sometimes necessary to anesthetize the urethra by the injection of ten c.c. of a weak local anesthetic, such as 1 per cent. stovain.

The irrigations should be employed at least once daily and should be continued as long as a discharge is present. This may be as much as two weeks; they should then be gradually discontinued, giving irrigation every other day, twice weekly, and finally once each week.

Potassium permanganate is used in strength of 1:8,000. Albargin is used in strength of 1:1,000. Protargol is used in from 1:1,000 to 1:2,000 strength, and argyrol from 1:500 to 1:250.

ASTRINGENTS

As soon as the gonococci have disappeared and been absent for several days a continued catarrh of the anterior urethra is best treated by astringents, and there is probably none better than the generally used zinc sulphate. Pedersen uses this salt in solution up to 2 grains to the ounce (.4 per cent.), and advises

injection twice daily, rarely three times daily, and then he gradually reduces the frequency. While zinc sulphate is often combined with several other ingredients for injection, such as fluid hydrastis, boric acid, etc., it probably acts as well in simple solution, as follows:

| | | |
|--------------------------------------|-------------|-------------|
| | gm. or c.c. | |
| R Zinci sulphatis..... | 50 | or gr. viii |
| Aquae | 100 | ℥ss iv |
| M. Sig.: Use externally as directed. | | |

This subacute stage of gonorrhea should cease in about two weeks, and if it persists longer it seems probable that there is some complication of a previous inflammation or a localization that should be definitely treated. If at any time during this subacute stage the secretion shows gonococci, the silver albuminoid injection may be used. During this stage the same restricted diet should be continued, but more exercise may be allowed.

If posterior or anterior urethritis persists with gonococci absent after the period of subacute inflammation has passed, the use of silver nitrate solutions has been advised. The whole length of the anterior urethra may be treated through an endoscope by means of a cotton swab medicated with 0.5 or 1 per cent. nitrate of silver solution; or there may be instilled by means of a deep urethral syringe a syringeful of a 1:5,000 to 1:250 solution of nitrate of silver, or a few drops of a 0.25 to 0.5 per cent. solution. Such treatment should not be repeated oftener than once in five days. The passing of all instruments through the urethra, even in this late stage of gonorrhea, should be done with the greatest of care, and thin, bland oils are the best lubricants.

If the morning drop persists follicular urethritis is probably present, irrigations are advisable, as if solutions pass from the anterior urethra back into the bladder they cleanse the mouths of the follicles which are directed forward, and the retained secretions are thus removed. For this purpose a solution of 1:30,000 of bichlorid of mercury or a saturated solution of boric acid, or a 1:2,000 potassium permanganate solution may be used. The solution selected would be given by e ordinary irrigation apparatus, viz., a short glass

urethral tube and the pressure necessary to cause the solutions to flow gently into the bladder.

If there is great disturbance from the posterior urethritis, the patient should be put to bed. The anterior urethra may be washed with boric acid solution and then the mucous membrane anesthetized with a 2 per cent. solution of eucaïn or 1 per cent. stovain, and a soft rubber catheter, 14 to 16 French, passed into the deep urethra. Then instill into the deep urethra 2 or 3 fluidrams (from 10 to 15 c.c.) of a silver albuminoid solution, or a solution of nitrate of silver in strength of 1:5,000 to 1:1,000. Such instillation may greatly relieve the patient of his distressing symptoms. This treatment may be repeated in a day or two, if it prove to be necessary.

It should not be forgotten that these apparently severe symptoms of a posterior urethritis may really be a prostatitis, or even the beginning of a prostatic abscess.

A posterior urethritis pure and simple in the acute stage of gonorrheal arthritis will rarely need irrigation treatment. As a general rule, it will be found that hot baths, absolute rest, a milk diet and the administration of alkalis will within twenty-four hours stop the intensity of the symptoms.

VACCINE AND SERUM THERAPY

Vaccines, serums, sensitized vaccines and autogenous serums have been used in gonorrhœa and its complications with startling reports of success or of complete failure. These methods seem particularly adapted to the treatment of the complications. The time is not yet ripe to state what their actual value is.

PROSTATITIS AND SEMINAL VESICULITIS

The most frequent, and the only frequent cause of inflammation of the prostate and of the seminal vesicles is gonorrhœa. Without regard to the importance of acute inflammation of these parts the chronic and persistent harboring of the gonococcus by these organs, making the carrier of these germs a menace to himself and others, makes the subject of vast importance. It is hardly necessary to state that most gynecologic

inflammations are due to the gonococcus, and most frequently the infection is received innocently and is due to a latent gonorrhea, or a chronic prostatitis or vesiculitis due to an uncured gonorrhea in the male. Chronic gonorrheal infection of the prostate and seminal vesicles is of comparatively frequent occurrence. The symptomatic evidences may be slight. There often is an increased frequency of urination; there may be a feeling of fullness or uncomfortableness in the perineal region; there may be a slight sticky, or mucopurulent exudate and the urethral drop, and the urine may be cloudy. On the other hand, the urine is not always cloudy with this subacute or chronic prostatitis.

While it is probably rare to find gonococci in prostatic exudate a year after the original infection, it does occur, and before a year the gonococci may be frequently found when there are no apparent evidences of the previous gonorrheal infection. When from massage of the prostate and stripping of the seminal vesicles the examination of the slide from the drops of secretion exuded from the urethra show gonococci, of course the diagnosis is positive. If such an examination shows no gonococci in a suspected individual, it has been suggested that from 1 to 2 c.c. (5 to 10 minims) of a 1 per cent. solution of nitrate of silver be injected into the posterior urethra with the Ultzman syringe. The stimulation from this injection will cause, the next day, an increased discharge, which should cause gonococci to be found on microscopical examination, if they are still present.

Besides the local symptoms above described of chronic prostatitis, patients who are suffering from this condition often have symptoms of neurasthenia and hypochondriasis. Men otherwise well, with no apparent cause for symptoms of nerve tire, should be carefully questioned as to previous gonorrheal infection, and the prostate and any secretion that can be expressed from it should be carefully examined, even if the local symptoms are negative.

Acute gonorrheal inflammation of the posterior urethra is, of course, readily diagnosed by the cloudiness of the urine. A later involvement of the pros-

tate or seminal vesicles is diagnosed by the finger passed well up the rectum and noting the enlargement and tenderness of the prostate, and, if the seminal vesicles are involved, by noting their fulness and tenderness. Normal seminal vesicles are hardly palpable.

Acute inflammation of the prostate and vesicles should be treated with rest, a diet of milk and simple cereals, plenty of water should be taken, and hot sitz baths once or twice a day. The urine should at first be rendered alkaline with potassium citrate during the acute irritation, and later hexamethylenamin or salol (phenyl salicylate) should be administered. There should generally be no urethral injections and no manipulation of the prostate, and certainly no passing of instruments into the urethra. If the prostatitis becomes localized and causes an abscess, of course the treatment is surgical interference.

In subacute prostatitis the prostate should be gently massaged, and some of the exuded fluid which is received on a glass slide should be examined under the microscope for pus and gonococci. Generally, there will also be found living spermatozoa and often dead spermatozoa, with prostate epithelial cells, and perhaps crystals of spermin. The tenderness of the prostate determines the frequency and the amount of massage that it should receive; perhaps every second day for a short time, and then twice a week. At each massage the seminal vesicles should be thoroughly stripped. During this subacute inflammation all violent exercise must be prohibited; alcohol should certainly not be allowed, and the patient is usually better without tobacco than with it. Tea and coffee, if allowed at all, should be in small amount. Constipation should be guarded against, particularly in prostatitis. It is always best to wear a suspensory bandage during acute gonorrhea, and during acute and subacute inflammation of the prostate.

The prognosis is good if the patient will give himself the proper rest in the acute condition, if he will take care of himself in the subacute condition, and will persist long enough in his treatment of the chronic condition.

If gonococci are present in this secretion in subacute or chronic inflammation, vesical injections of weak silver solutions, such as from 1:500 to 1:1,000 of one of the albuminate silver preparations, should be given daily or every other day, and at least every other day or generally every day the prostate should be massaged while the solution is in the bladder. The patient then urinates and thus washes out the bladder. These bladder washings should soon be less frequently repeated, and as soon as the gonococci are found absent from the prostatic secretion, the bladder injections are given only infrequently. A microscopic test should be made once a week for three or four times, and then again in a month. The gonococci remaining absent, the patient may be considered cured of the infection. The old assertion that when the gonococci had infected the prostate vesicles the patient could never be cured, but harbored them for the rest of his life, is probably not now true if the affected individual will allow himself to be properly treated before the germs have found a more permanent harbor deeper within the glandular tissue.

In chronic prostatitis without gonococci, or after the gonococci have disappeared, besides massage of the prostate once or twice a week, local applications can be made by high injection of from 1 or 2 c.c. (5 or 10 minims) of various silver solutions, the strength of which should vary from 1 to 3 per cent. Instillations should not be used more frequently than once in five days. Ichthyol solutions have also been used for this purpose. The cold sound is occasionally of as much advantage in the posterior urethra as it is in gleet conditions of the anterior urethra. Not infrequently the double closed catheter, which allows the circulation of cold water, is one of the best tonic treatments of the posterior urethra and prostate. Such treatment is indicated only in the chronic form of the inflammation when the prostate has not returned to its normal size, normal tone and normal feel.

In chronic gonorrheal infections particularly the vaccine and serum preparations seem to offer most hope of success. They may certainly be given a trial.

Like any other inflammation that has become chronic, a patient who has become neurasthenic and mentally disturbed and perhaps below par physically, should receive tonic treatment and such a vacation as he may be able to take, and the local inflammation will often rapidly improve when it has not improved under more active medication. It should be urged that after the gonococci have disappeared, too long use of instruments should be discouraged.

CHRONIC HYPERTROPHY OF THE PROSTATE

This condition should be distinguished from enlargement of the prostate due to a subacute prostatitis, which is an inflammation that affects the ducts and is generally due to an infection that has come from the urethra. Although this enlargement of the prostate may persist for some time, proper local applications and massage will generally effect a complete cure.

True chronic hypertrophy of the prostate develops insidiously and is of frequent occurrence as it is present, in various grades, in about 65 per cent. of all men after the age of 50. The treatment of this condition is well discussed under three heads: prophylactic, palliative, and operative.

PROPHYLAXIS

As the etiology of chronic hypertrophy is not clearly understood, it is difficult to lay down a definite rule for prophylaxis. While it is probable that this is a normal accompaniment of old age, the reason that it occurs so frequently at an earlier age, from 50 to 60, may be because of excessive or abnormal sexual activity. Investigations seem to show that benign hypertrophy occurs very much more frequently in the married man than in the single man.

There seems to be no question that frequent, and especially abnormal sexual excitement does congest the prostate, and repeated prostatic congestions lead to a slow hypertrophy. It is also probable that a bad heart which allows venous congestions, especially when the veins of the pelvis (and the hemorrhoidal veins especially) are dilated, would become an impetus to passive congestion and later to hypertrophy of the prostate.

Persistent constipation would be another added cause of this passive congestion. Bladder irritation and irritability, if frequently repeated and never completely cured, could be a cause; while varicocele could be another cause for prostatic congestion. In other words, anything that tends to repeated pelvic acute congestion or chronic pelvic passive congestion may well be an exciting cause to the enlargement of the prostate, which organ is always apparently ready to enlarge after the age of 50. Consequently, any treatment that removes or prevents these congestions would be prophylactic treatment against hypertrophy of this gland.

EARLY SYMPTOMS

The early symptoms of an enlarging prostate are increasing frequency of urination, especially at night; slight delay in starting urination, especially early in the morning or when the bladder is full; and a slight diminution in the expulsive force of the stream. These symptoms have usually been present many weeks, and even months, before the physician is consulted. By this time the hypertrophy has advanced to a considerable degree, and enlargement of the prostate, as shown by examination, is generally positive. The question immediately arises as to whether palliative treatment should be advised or an immediate operation performed.

It would seem unwise, even with the very low mortality when the operation is done at this period, from the fact that there is a mortality, to urge immediate operation. Neither the condition itself nor the operation is really the cause of the mortality, but it is due to the concomitant or coincident insufficiency of the kidneys, possibly to an arteriosclerosis. It should be remembered that when a man is suffering from chronic hypertrophy of the prostate he also has probably used his circulatory system to excess, the arterial tension is generally high, the heart may be in perfect condition but undoubtedly the left ventricle has become hypertrophied to combat normally increased tension of the man's life and the increased tension of the arterial system due to advanced years. Also, although the heart apparently may be perfectly normal, the kidneys

are often imperfect at this age, as would be evidenced by repeated examinations of the twenty-four hours' urine on different diets and under different irritations or exertions. In other words, kidneys, that are perfect during the ordinary daily life, when the patient is subjected to an etherization or to the slight shock or disturbance of an operation, become insufficient, and uremic symptoms readily develop. Therefore, the treatment of the above condition should at first be palliative.

The great source of danger is residual urine, *i. e.*, the urine which remains in the bladder after the patient has urinated and which he cannot evacuate by voluntary effort. That there is a residual urine can be determined only by the passage of a catheter. A soft rubber catheter properly sterilized can generally be passed without difficulty, this after the patient has urinated, and after the parts are thoroughly cleansed and rendered aseptic. A study of the urine that the patient passed (and best a study of it in the two-glass test), and a study of the urine which may be drawn by catheterization, *i. e.*, the residual urine, will not only determine the character of the urine, but also the condition in the bladder. An acid urine, clear, without pus, without much mucus, without blood caused by the catheter rubbing over the prostatic urethra, shows that temporizing and palliative treatment should be the treatment elected. The evacuation of clear urine by the patient does not positively preclude the possibility of even a large amount of residual urine, as absolutely clear urine may be passed on repeated days and yet catheterization remove a large quantity of turbid residual urine. If there is no residual urine, good; sensible tonic treatment, a proper amount of rest, a properly regulated diet, good management of the bowels, prevention of chilling, and the happy medium of never attempting to hold the urine too long or on the other hand answering every frequent flitting desire to urinate, may hold the patient in the same condition for months or even years. It is undesirable to allow the patient to urinate too frequently, because it prevents the bladder from becoming normally distended, and the viscus becomes smaller and smaller until life becomes a misery.

If there is much mucus from the bladder, or if there is prostatic irritation sufficient to give local aching or a pain in the penis, the first treatment should be to draw the residual urine, then gently wash the bladder with a warm 2 or 3 per cent. boric acid solution. When the bladder washings are clean, the bladder should once more be filled with the warm solution and then the catheter removed and the patient allowed to pass the liquid. Care should be taken not to over-distend the bladder with these solutions. This washing may be done every day for a few times and then infrequently, or absolutely stopped if the symptoms subside.

If there is but little mucus in the urine, but vesical irritability, especially at the neck of the bladder or perhaps slight referred pain at the penis, the instillation into the bladder of 1 c.c. (15 minims) of a 1 per cent. solution of nitrate of silver, once in five days for a few times, or injection into the bladder of 60 c.c. (2 ounces) of a 1:5,000 solution of nitrate of silver and then withdrawing the catheter and allowing the patient to pass the solution, will frequently effect a temporary cure, and may give the patient relief for months.

If pus is present in the urine and the condition is acute cystitis, the usual treatment of this condition must be given, viz., daily bladder washings with warm boric acid solution. If a chronic cystitis has already developed, the bladder-washing must be with some of the various silver solutions, either an organic silver solution or a very weak nitrate of silver solution. The silver solution must not be used too frequently. One would hardly advise an operation during an acute cystitis, and would not urge it in chronic cystitis until the bladder was as surgically clean as possible; in other words, prolonged, proper treatment, with the patient at rest. It is unnecessary to state that an operation, when chronic cystitis is present, *i. e.*, when an infection is present, is of much more serious prognosis. It is impossible to tell how much the ureters may have become infected or whether the kidneys have been injured from the infection in the bladder, to say nothing of their secretory ability.

Whenever there is cystic irritability or genito-urinary inflammation the diet should be just as carefully regulated as is so well understood in specific urethritis, viz., in acute cystitis or in acute irritability of the bladder a milk and cereal diet should be given with rest and hot general baths. In chronic inflammation of the bladder or of the prostatic region daily hot sitz baths are of great benefit, and the diet should be of simple meats, ordinary vegetables, cereals, and fruit. Highly spiced foods should be forbidden, coffee and tea should be forbidden, and generally tobacco also, excessive use of alcohol should be interdicted, and no drugs should be given that could irritate the genito-urinary tract. As above urged, the bowels should be carefully regulated. Constipation does harm in all pelvic inflammations.

Acute irritability of the bladder may be partially relieved by the judicious use of drugs that render the urine alkaline, but when there is an enlarged prostate and any tendency whatever to residual urine, the urine should not be rendered long alkaline. The simplest prescription for this purpose is:

| | gm. or c.c. | |
|--------------------------|-------------|---------|
| R Potassii citratis..... | 50\| | or ʒ ii |
| Aquae gaultheriae..... | 200\| | ʒv viii |

M. Sig.: Two teaspoonfuls, in water, three times a day, after meals.

It is often inadvisable to have the patient drink a great deal of water as it will over-fill the blood-vessels (the age of the patient must not be forgotten), raise the arterial tension, increase the frequency of urination, and may precipitate the occurrence of residual urine.

If there is chronic cystitis, no drug is probably more valuable than hexamethylenamin, which may be given as follows:

| | gm. or c.c. | |
|----------------------------|-------------|-----------|
| R Hexamethylenaminae | 10\| | or ʒ iiss |
| Fac chartulas, 20. | | |

Sig.: A powder in half a glass of water, three times a day, between meals.

CATHETERIZATION

If there is residual urine and this (which may vary in amount from day to day) persists from day to day, it is only a question of time when the patient will have a sudden stoppage and be unable to empty the bladder and must send for a surgeon for immediate catheterization on account of distention of the bladder with resulting paralysis. This having once occurred, some surgeons advise the use of a catheter continuously. It is possible in such an instance that if a proper attendant with the most careful cleanliness uses the catheter at least three times in twenty-four hours, and perhaps better four times, in a few days the bladder may return to its proper tone and may be as good or better than it has been before for a number of months, *i. e.*, may not contain so much residual urine. This should be tried. If, on the other hand, the bladder does retain residual urine, and the urine tends to be alkaline and turbid, the man must be given a catheter to use himself, either once in twenty-four hours to remove all residual urine, or three times in twenty-four hours if he cannot at any time well evacuate his bladder. This kind of treatment is sometimes necessary on account of the inadvisability of operating, but is generally inexcusable, as it is only a question of time when such a bladder will become seriously infected and chronic cystitis, incurable, will be the result, and cause the death of the patient. Therefore, unless there is some positive reason why a man can not be operated on, operation should be advised, and advised before infection has occurred.

Some patients develop a chill after the passage of even a soft rubber catheter, or even have what has been called the urethral fever, with considerable rise of temperature for some hours. This is not of frequent occurrence, and may never be seen by an individual practitioner. Other surgeons have seen it so frequently that they recommend the administration of some drug to prevent this hyperirritability of the urethra, such as bromids, and even quinin has been recommended. If such a reaction occurs, the patient should be kept in bed for twenty-four or thirty-six hours and

treated symptomatically. No harm seems to come from the disturbance.

Simple palliative treatment of the condition being unsatisfactory, reflex pain in the penis or irritability of the bladder, persisting, cystoscopy should be carefully done, and the possibility of a stone in the bladder should be considered. It must, however, be urged that a mild subacute condition is often precipitated into an acute one by such instrumentation. However, it is a means to an end, *i. e.*, positive diagnosis of the condition, and must often be done, but not done without due and careful consideration. To save repeated instrumentation, at the same time the bladder is cystoscoped, it is well to pass a catheter into each ureter to examine the urine from each kidney separately. The results of this examination will aid in the decision as to whether or not an operation should be performed.

OPERATION

It is the object of the careful physician and surgeon to aim to determine, when palliative treatment is useless or in any given patient is becoming useless, to advise operation if the kidneys and circulation are in good condition before the patient becomes miserable, before the bladder has become infected, before the bladder has become seriously thickened, and before it has become paralyzed from over-distention or has become badly contracted from protracted and frequent efforts to expel urine over the obstacle of the enlarged prostate. As above stated, infection of the bladder may creep up toward the kidneys, and with infection of the bladder, and even without it, continued pain and irritation in this region may cause a general debility, loss of appetite, emaciation and feebleness. Of course, any of these conditions being present when the patient first comes to the physician would demand, first, rest, careful preparation of the bladder and the pushing of nutrition, and second, operation; but the patient having been under a physician's care the operation should be advised and done before he reaches this sad condition.

Which particular operation is best for a given individual, or the technic of the operation are questions of surgery; it is enough for the physician to decide that

an operation is necessary. The results of perineal prostatectomy are surprisingly good when one takes into account the advanced age of many who submit to the operation, the frequent coincident cystitis, the history of prolonged pain and often debility of the patients, and the impairment of circulatory and excretory organs concomitant to their age. Many patients over 80 years of age are operated on with good results and their lives greatly prolonged by the operation, and the mortality has been placed even below 4 per cent.

The differential diagnosis between tumors of the prostate and simple hypertrophy of the prostate can not well be described. The greater amount of pain in most tumors of this age (the most frequent being cancer), with the greater rapidity of growth, with the nodular feel and enlargement in all directions as well as into the bladder, generally quickly shows that the enlargement is malignant and not benign.

OBSTETRICS AND GYNECOLOGY

TOXEMIAS OF PREGNANCY

The disturbances which occur during pregnancy and some of the severe conditions at parturition are due to varying causes, and the treatment that is efficient and satisfactory in one instance may not be efficient in another.

Various causes have been associated with uncontrollable vomiting and toxemia of pregnancy. The view has been advanced that the condition is essentially anaphylactic in character. Further, intestinal indigestion, disturbances of the parathyroids and thyroid; disturbances in the fetal organism, in the placenta, in the kidneys and in the liver have been incriminated.

When instances occur which are positively demonstrable of serious toxemias being caused by prolonged constipation, it is certainly logical to presume that constipation even in a mild form is provocative of the absorption of toxins that should have been eliminated by the intestines. These toxins seriously impair the perfect activity of the liver, to which they first go through the portal circulation. If the liver is so continuously irritated it can not well do its normal work, and more or less toxins or irritants to metabolism soon get through this filter into the systemic blood and cause nervous, circulatory and kidney irritations. Such irritations at first, and perhaps continuously, may be inconsequential, but they may be the forerunners or the instigators of serious conditions in the latter part of the pregnancy. A primary axiom in pregnancy, then, should be that constipation must not be allowed, and such means must be inaugurated and persisted in as will prevent constipation, intestinal stasis, intestinal fermentation, putrefaction and the absorption of toxins. If any one of the digestive organs is not properly functioning it should be assisted, if possible, and the diet so arranged as not to aggravate this disabled organ, and to relieve it of as much work as possible.

HYPOTHYROIDISM

It has been demonstrated, apparently, both physiologically and clinically, that the thyroid gland normally hypersecretes during pregnancy. If the thyroid does not secrete properly, various toxemias occur. A mal-secreting thyroid may be related to pernicious vomiting during pregnancy, can certainly interfere with the nutrition of the fetus, and can interfere with the health of the mother.

If by a careful study of the pregnant patient it is decided that the thyroid gland is not properly secreting, thyroid substance should be administered. The dose during pregnancy should be small. Just preceding parturition, it is feared that eclampsia may occur, and especially if the kidneys are insufficient, thyroid may be given in larger doses. If a patient gives birth to a child showing imperfect development or symptoms of under-thyroid secretion, although it might not be a cretin, thyroid may be administered to the mother throughout her subsequent pregnancies, unless symptoms forbid its use. A daily dose for a pregnant patient, short on thyroid secretion, should not be more than 0.20 gm. (3 grains) once a day, while a patient who shows serious toxemia or critical symptoms of metabolic poisoning should receive 0.30 gm. (5 grains) three or four times a day for a short period. A patient needing thyroid just before or during parturition may be given 0.60 gm. (10 grains) once or twice, while a patient with eclampsia may be given 1.30 gm. (20 grains) at one dose. Other preparations of thyroidin or Kendall's preparations may also be used.

OTHER CAUSES OF TOXEMIA

Malnutritions of the fetus and degenerations of the placenta may cause the formation and absorption of toxins that will poison the mother. Such toxemias partake of the nature of blood poisoning. The cause being discovered and improvement not soon taking place would seem to call for cleaning out the uterus — this, of course, after a consultation.

An uncomplicated true nephritic toxemia should certainly be discovered. A uremic condition from nephritis of pregnancy must almost always be a pro-

gressive condition. Consequently a progressive chronic nephritis can only be overlooked by utterly neglecting to make proper examination of the urine. If a chronic nephritis, by evidences in the urine, shows a progressive inflammation, a final toxemia, due to allowing a pregnancy to continue too long before interference, should be prevented. Consequently the most serious toxemias and eclampsias are those that do not present kidney symptoms or signs until the last moment, and these toxemias are due primarily to disturbances of other organs than the kidneys.

If the kidneys were previously healthy, i. e., if an insidious chronic interstitial nephritis were not present, a nephritis due to pregnancy should be quickly recognized by the albumin in the urine. Therefore, an examination for albumin and casts is usually sufficient to show whether the kidneys are in primary trouble or not.

TREATMENT

Byers (*Brit. Med. Jour.*, May 22, 1915, p. 2838) believes that every effort should be made to relieve the kidneys by getting the skin and bowels to act and by the administration of a simple non-nitrogenous diet. If there be headache or edema the patient, in addition, should be kept in bed and should have hot baths, free purgation and a milk diet; and if the state of affairs becomes more severe, warm saline lavage of the stomach and intestines is useful. In the nephritic cases, if in spite of this method of management the patients get worse, labor should be induced. One of the most important points emphasized is that a pregnant woman's urine must be analyzed once a month during the first six months of gestation, and at least once a fortnight after that period.

VOMITING OF PREGNANCY

The cause of severe vomiting of pregnancy has not been determined. The condition most frequently appears between the third and fifth week of pregnancy. Among many causes which have been suggested are reflex influences such as pressure on nerves connected with the uterus, stomach and other abdominal viscera (and of these the most important are those

due to displacement of the uterus and its adnexa) neurotic or hysterical, and toxemic. The latter naturally gives the most trouble because, primarily an auto-intoxication, it is almost invariably a combination of several evils.

First, then, a complete history of the patient should be taken, an opinion formed as to her normal mental or nervous temperament, and a thorough and complete physical examination made. If the condition is due to hysteria, the patient should generally be isolated and moved if possible to a situation where she will have an entire change of surroundings and attendants; the treatment then becomes mostly hygienic and suggestive.

UTERINE DISPLACEMENT

If examination reveals a misplaced uterus (and probably a retroversion is that most frequently found), replacement should be made immediately and a properly adjusted pessary placed to maintain the correction until such time as the enlarging uterus will retain its proper position unaided. Occasionally adhesions may be found which prevent the manual correction of the fault. The condition then becomes more formidable, and recourse must be had to surgery. The same holds good in incarceration, and in this condition not infrequently corrective measures result in abortion. Erosions of the cervix, cicatrices, and polypi may be causes of the nausea and vomiting, and these if found should receive proper attention. However, surgical procedures, unless of a most trivial nature, should be reserved as a last measure, since they are liable to induce abortion, as are also such procedures as may require either a tampon of any considerable size, or packing of the vagina.

If the vomiting still persists after all corrective measures possible have been made, there remain two conclusions: the vomiting is either idiopathic, or due to intoxication. The former term, of course, dodges the issue, but nevertheless brings the treatment under two headings, and the conclusion to be drawn from the mass of statistics seems to confirm unquestionably the comparative uselessness of drugs to meet either condi-

tion. Almost everything has been used, and with no further benefit generally than a temporary mitigation of the symptoms.

SUPPORTING NUTRITION

The two great difficulties are the maintenance of the patient's nutrition and the combating of the prostration caused by the vomiting. Under whichever heading we choose to meet the case, hygienic measures stand first and nothing should be omitted which tends to their furtherance. The diet should be of the simplest, and milk should form its bulk. One after another of its simple dishes must be tried, to be discarded if they are not retained. When the patient is first seen, if the stomach is washed out and nothing allowed but water for twenty-four hours, the bowels being thoroughly cleaned out meanwhile, milk will generally be retained. Just before giving the milk a small dose of cocain, 0.01 gm. ($1/6$ grain) may cause it to be retained. If it is retained, the drug may be given previous to further administration of food, lessening the dose each time, and, not infrequently, when a placebo is ultimately substituted for them, the food will be retained as well. Sooner or later, unless conquered, even these so-called idiopathic cases are found to have their etiology in intoxication and elimination becomes the main point of all treatment.

The urine of course should be examined with great frequency and close watch should be kept on the elimination of solids, but an undue anxiety because of their diminution should not be felt when the intake of food or the food retained is small. A due regard to this should be kept in mind.

The bowels should be moved freely once a day. A single dose, 0.25 gm. (4 grains) of calomel with a little bicarbonate of soda, 0.25 gm. (4 grains) is preferable if it can be retained; if not, a daily enema must be given. If there appears to be any sluggishness on the part of the small intestines, 0.001 gm. ($1/60$ grain) of physostigmin salicylate should be given hypodermatically once or twice a day, as may be sufficient.

Daily warm baths, with massage, plenty of fresh air, the patient kept in bed, the avoidance of the odor of

cooking food, and the avoidance of all measures that tend toward excitement are of advantage. Counter irritation by mustard plaster or turpentine stupes placed over the stomach is generally a help and sometimes efficient. Also carbonated or effervescing drinks will often be retained when "still" liquids are vomited.

Sodium (or potassium) bromid is often of service in these cases. It is best given in one gram (15 grains) doses, well diluted, by mouth, if possible; if not, by rectum and repeated every two or three hours until the vomiting is conquered or the treatment proves useless.

Although bromids appear to be efficient, thyroid is not infrequently of use. It should be tried in small doses, say 0.20 gm. (3 grains), and if retained, perhaps larger doses, up to 0.50 gm. ($7\frac{1}{2}$ grains) every four hours for a sufficient number of times to prove or disprove its efficiency.

Zuloaga (*Arch. Mens. d'Obstet. et de Gynéc.*, 1914, iii, p. 433) has called attention to the relation of adrenal insufficiency to such toxic vomiting. In several severe cases in which the adrenals were found to be lacking in function he gave 10 drops of epinephrin every eight hours. All symptoms subsided and the pulse and blood pressure returned to normal. The epinephrin was suspended after a month and the women began to vomit anew, so that the epinephrin was resumed and 5 drops given every twelve hours until delivery. During the latter months he alternated two weeks of the epinephrin with two weeks of calcium glycerophosphate.

The food, as above stated, should be liquid, and preferably milk, while buttermilk (cold), koumiss, and egg albumin lemonade are useful. Generally small quantities only should be given, and at frequent intervals. When the liquid food becomes well tolerated, semisolid food and the simpler dishes, one after another, may be tried.

When all measures have failed to control the vomiting and before the patient has actually reached a dangerous condition of prostration, consultation should be had and measures should be taken to empty the

uterus. Naturally, of course, one waits as long as possible before doing this, and not infrequently waits too long; hence this caution.

ECLAMPSIA

There is probably no condition that the medical man has to cope with that makes, from prodrome to sequelæ, such demands on his capabilities, his judgment, and his tact as does the symptom complex of this toxemia, for intoxication it is, poorly though we may understand it and little as we know of its etiology. Having its cause in some disturbance of the chemistry of either internal secretion or metabolic function, or both, its treatment must necessarily be elimination until an increased knowledge of the condition permits it to be corrective.

When it is possible to take the patient to a hospital, this should be done at once, for a case of eclampsia can at any moment present conditions which even the resources of a hospital, with its trained attendants, find difficulty in meeting, and these conditions can change with a rapidity which none but institutional resources may attempt to meet. Whatever difference of opinion there may be concerning other features of this condition, there can be no question that more cases are saved under institutional treatment than under any other, and only by reason of their increased facilities. If it be impossible to take the patient to an institution, and home treatment becomes a necessity, then the first thing to do is to prevent self injury to the patient by instructing some one present how to hold a towel, cork, or a rubber eraser between her teeth, and to keep her on the bed.

EXAMINATION

Next, a thorough examination should be made, and if there are convulsions present or the examination starts one, a sufficient amount of chloroform may be given to allow the examination to be completed, and that thoroughly, for it is more important to know the exact condition present than to start any treatment with an incomplete knowledge of the case.

The examination having been completed, if delivery is indicated the cervix can usually be completely dilated

under chloroform without instrumentation (*i. e.*, with the hand), forceps applied, and delivery completed. The placenta should generally then be removed, not waiting the usual twenty minutes, and the method of Credé is preferable.

Generally there is a tendency to profuse hemorrhage, and the placenta having been removed, the uterus should be thoroughly irrigated with hot physiologic saline solution and it and the vagina packed with sterile gauze. However, the packing being in readiness, it is good judgment to wait a few moments before using it to see if the hot irrigating solution provokes sufficient contraction to stop the bleeding, for if it does, there is avoided the presence of an unnecessary foreign body in the uterus.

Laceration, if present, should generally be repaired at once, always if it has caused hemorrhage. If not, the patient's condition may occasionally make the postponement of the repair advisable.

If indications for immediate delivery are not found, *i. e.*, if the cervix is not much shortened or not much softened, the os undilated, and few or no uterine contractions (and this last is the most important determining factor, since uterine contractions appear to excite the eclamptic convulsions) eliminative treatment should be started. If there is stertorous breathing, with small pupils, and slow, full, high tension pulse, and if the patient be more or less comatose, "bleeding" is indicated, and from 150 to 250 c.c. of blood should be removed, but whether or not this should be replaced with physiologic saline solution only the condition of the patient at the time can determine, certainly not if there is any edema. If it seems desirable, the quantity of saline introduced should not be less than three or four times that of the blood withdrawn. Next flush out the colon with saline solution and allow 1,000 c.c. or more to remain for absorption, provided of course that there is no edema, and particularly should the lungs be carefully examined with this in mind. Next, wash out the stomach if possible, and if done at all do it thoroughly, leaving in it 0.40 gm. (6 grains) of calomel, with a little sodium bicarbonate. Then apply the hot pack, and when perspira-

tion ceases, usually in about half an hour, dry the patient's skin thoroughly and keep her between blankets. The hot pack may be repeated in two or three hours, if necessary, and if there is vomiting the stomach may again be washed out, leaving in it another dose of thyroid, and a smaller dose of calomel should there be reason to believe that the first dose was vomited. In short, this eliminative treatment must be kept up until the uterus can be emptied. If it seems inadvisable to wash out the stomach calomel may be given by mouth in the dose above referred to.

STIMULATION

Bladder distention is common and must be borne in mind, catheterization frequently being necessary every six or eight hours for several days after delivery.

Should stimulation be necessary, epinephrin hypodermatically, with or without physiologic saline solution, may be used to advantage. Strychnin is generally advised, but its use in conditions of cerebral excitation seems inadvisable. Certainly not more than one dose should be given and that not over $1/30$ of a grain. If further stimulation appears to be needed, another drug should be substituted for it—either caffein hypodermatically, or as black coffee by the mouth, and this may be followed, if another change seems advisable, by the hypodermatic use of camphor in olive oil (1 c.c. of the saturated solution), and this may be continued at half-hour intervals.

After delivery, if a sedative is needed, there is none better than a combination of sodium bromid, 2 gms. (30 grains), and chloral hydrate, 0.50 gm. ($7\frac{1}{2}$ grains), well diluted and given by rectum. This may be repeated in an hour if necessary, but a single dose is generally sufficient. Morphin, too, is frequently advised and given, but in such a condition as this it would seem contraindicated in practically every instance. There is no pain to combat, and usually the patient will sleep from mere exhaustion if her "nervousness" is controlled.

The quantity of morphin required to control this nervousness will of necessity be altogether more than necessary to meet every other condition, while on the

other hand, if her condition is approximating coma, morphin becomes about as dangerous a drug as could be given her.

When delivery is completed the danger is by no means over, and a careful watch of the patient is necessary, for it must be remembered that the sequelæ of this condition are numerous and a patient can not be called out of danger until at least ten or twelve days have passed, and prognosis at any time before this is little more than a guess.

Should the child survive, it is in all probability also toxic. It should be given water freely, and also, perhaps, colon irrigation once or twice daily. Prognosis as to its survival should be absolutely declined.

PUERPERAL INFECTION

Though septic infection after parturition occurs much less often than even a few years ago, it is still sufficiently frequent to necessitate resort to every possible method of prevention and to the thorough consideration of effective but non-meddlesome treatment.

This infection occurs most frequently in one of two general forms. One is a typical blood-poisoning or sapremia, which is caused by the absorption of toxins or decomposition of products of substances that are undergoing putrefactive or other chemical changes in the genital tract. Of course the most frequent substances causing such poisoning are retained fragments of the placenta or membranes, or, if there is any obstruction to the exit of the normal lochia, there may be absorption from this. Such poisoning may be termed an auto-intoxication or autotoxemia. This poisoning may cause more or less rise of temperature, but it may not be high, and although an increased temperature in the first few days after parturition may be due to a bowel infection, to the absorption of bowel toxins, to some disturbance of the mammary glands, to some bladder or kidney disturbance or, of course, to some acute infection to which the patient may have been exposed, still, generally, the cause of such fever will be found to be in the genito-urinary tract. Slight injuries of the uterus, vagina or perineum during parturition may allow absorption of and poisoning by discharges that would otherwise be innocuous.

The other more serious cause of puerperal infection or puerperal fever is the absorption and circulation of pathogenic bacteria. Of these may be mentioned some varieties of streptococcus, pneumococcus, staphylococcus, gonococcus, and perhaps not infrequently the colon bacillus. Localized infections and more or less general disturbance from the last three of these pathogenic germs may not be serious infections as far as the immediate consequences are concerned and perhaps could hardly be called septic fever. Infections, however, from some form of streptococcus and occasionally from the pneumococcus are always serious; the patient is septic and is suffering from dangerous septicemia. A puerperal streptococcic infection quite commonly, though not always, will show a bacteriemia and may have as a complication endocarditis, even the malignant type, with perhaps associated local lesions such as pneumonias, pleurisy and kidney infection, a pyelitis or a localized septic process in the kidney substance. Such a general infection is usually associated with more or less pelvic inflammation and pelvic tenderness, but is commonly without any pelvic abscess or purulent discharge.

It can easily be understood how a slight injury or even a denuded surface of mucous membrane in the genital tract, consequent on parturition, with its surrounding vascular supply normally increased and lymphatic supply perhaps increased owing to the needs of the previous pregnancy, gives such a dangerous possibility and almost a probability of the absorption of poisons and germs. A certain amount of abnormal absorption generally occurs, but is combatted by the normal woman. Such small absorptions are probably the cause of the frequent slight rises of temperature which last for a few hours or a day and then disappear, representing the normal neutralization of such toxins or the normal rendering inert of such germs. In other words, the resistance of the patient has proved entirely sufficient to combat the infection.

If we accept the wound or abrasion theory of most puerperal infections the poison is really external to the body and is absorbed, unless there is some previously localized infection, such as that from a gonococcus.

Consequently, the prevention of infection before, during and subsequent to parturition, proper cleanliness and care of the patient without meddlesome and obstructive treatment or methods of treatment, and without removing Nature's own protective secretions, are the objects at which to aim.

PREVENTION OF INFECTION

Most of the preventive measures are too well understood to require more than enumeration. The selection and preparation of the room, the preparation of the patient and of himself are well understood duties of the attending physician. The nurse also well understands the preparation of herself. A few details, however, should be emphasized. The nose of the patient should be gently sprayed and cleansed with an alkaline or mild antiseptic solution. The mouth and throat should be washed with some mild antiseptic mouth-wash, and the teeth thoroughly cleansed. The nurse should not give the patient a vaginal douche unless ordered to do so by the physician. The nurse should be free from any purulent discharge, especially from the nose, throat or even ears. She cannot be too careful in observing the greatest possible cleanliness in the care of the vulva and the vaginal discharges, with the use of such antiseptic solutions and gauze as the physician directs. If the patient must be catheterized, too great care cannot be taken to prevent infection of the bladder.

Although a physician may take every means possible for personal disinfection and wear a sterilized gown and rubber gloves, it seems, except in isolated instances, unjustifiable for him to accept a case of obstetrics while he is in attendance in a case in which there is contagion, or immediately subsequent to handling such a case, whether it be scarlet fever, erysipelas, measles or diphtheria. After having cared for a patient with puerperal fever, he should not accept another case of obstetrics for some time and he should not attend a case of obstetrics while he is caring for any septic patient.

The patient ordinarily should not be given a vaginal louché just before parturition. Very frequently one vaginal examination by the physician, to determine

the exact position of the child and the condition of the os uteri, is all that is needed. This examination should be made after sterilization of the hands and with the use of rubber gloves. When there is any delay in a normal labor, any apparent malposition, or other complicating disturbance, several vaginal examinations must be made. Of course in all operative interference manipulations are more or less necessary, and although the instruments may have been properly sterilized, injuries to the parts are very likely to occur and the danger of future infection is much greater.

If there is any purulent catarrh of the vagina, especially if gonorrhea is present, cleansing and perhaps mildly antiseptic douches should generally be used. On the other hand, with a normal vagina it seems unwise to remove the secretions which facilitate the expulsion of the child and at the same time protect the mucous membrane.

There is a difference of opinion as to the proper management when portions of membrane or of the placenta are found by examination of the expelled after-birth to have been retained. Some obstetricians would leave these retained substances to be loosened and expelled by natural processes, when ordinary gentle manipulation of the uterus does not expel them. Others believe that the sterilized, rubber-gloved hand should gently clean the vagina, and, if necessary, the uterus. The removal of retained portions of the placenta may prevent unpleasant and even dangerous hemorrhage.

The routine administration of fluidextract of ergot three or four times daily for several days after parturition in 1 c.c. (15 minim) doses, is believed by some modern obstetricians to aid and hasten involution of the uterus. If for any reason ergot is not tolerated or is inadvisable, quinin in 0.2 gm. (3 grain) doses twice a day may be of benefit in furthering this object. The use of pituitary extracts is now a recognized clinical procedure in such cases, but they should be given with caution as to dosage.

TREATMENT OF PUERPERAL INFECTION

If some form of puerperal infection has occurred, of course the first decision is as to whether or not it is

local or general. In a local or pelvic disturbance with more or less rise of temperature but without any symptoms of general infection, the treatment should be conservative and more or less symptomatic. The bowels should be carefully attended to, the diet should be simple but sufficient, large amounts of water should be drunk to dilute all the secretions, and Fowler's position should be used more or less continuously to encourage drainage. Again, vaginal douches generally should not be given.

It has been shown that the action of yeast increases leukocytosis and more or less inhibits intestinal intoxication; therefore its administration is good treatment in most infections and is very valuable in pelvic infections. From one-sixth to one-fourth of an ordinary compressed yeast-cake, dissolved in a glass of water, should be given three times a day, unless it causes too much looseness of the bowels. Vaginal douches of yeast solutions have been used and are said to be of value.

Of course the vaginal discharge, or, better, the uterine secretion directly obtained, should be studied bacteriologically to decide, if possible, what infection is present. According to Watkins (*Am. Jour. Obstet. and Dis. Women and Child.*, 1913 Sept., abstr. *Jour. A. M. A.*, 1913, lxi, p. 1485), the bacteriologic examination of vaginal and uterine secretions is of relatively small value, as the results are often uncertain and misleading. Blood-cultures are the only means at present of accurate diagnosis of the variety of infection. The result of this examination may suggest the use of an antiserum or a vaccine, if either be deemed advisable. The blood should also be examined for pathogenic bacteria.

If a parturient patient has a sudden chill more or less severe, with a rapid rise of temperature which persists in some degree and is not intermittent, and a rapid pulse, puerperal infection has probably developed, unless some serious condition like pneumonia is about to occur. Other symptoms of this general streptococcic infection are: a diminished amount of lochial discharge, perhaps even without odor; more or less tenderness in the pelvic region; a coated and perhaps

dry tongue; bad, perhaps septic, breath; scanty urine; severe lumbar pains; tympanites; at times yellowing of the skin, and later, if the infection progresses and becomes serious, possibly delirium. The progress of the fever is that of a typical septicemia. There may be irregular chills, profuse sweatings and more or less leukocytosis. If the lungs, breasts, kidneys and throat have been excluded as the location of the cause of the temperature rise and onset of symptoms, and if the uterus is tender and enlarged, as it generally is, acute puerperal streptococci infection is in evidence.

The insistence here should be on the fact that because there is a septic puerperal infection, it is not forthwith an indication for a uterine curettage, or intra-uterine or vaginal douching or any other severe operation. The general treatment just outlined for a more localized simple puerperal pelvic infection should be carried out, with more or less tepid spongings to control the high temperature. The bowels should be freely moved each day, large amounts of water should be drunk and perspiration should be encouraged, though the body should be kept clean by frequent warm spongings and alcohol spongings. The outdoor treatment in Watkins' opinion is the most valuable remedy known as yet in the treatment of puerperal infection. The beneficial effects of that treatment in his cases have been very noticeable, especially as regards improvement in appetite, sleep, temperature and pulse.

The heart may be stimulated by infrequent doses of strychnin, not more than 1/30 grain once in six hours, with caffein (perhaps best as coffee) twice in twenty-four hours, if no delirium is present. Camphor is another valuable cardiac and nervous stimulant and 20 or 30 drops of the official spirit of camphor, given properly diluted once in four to six hours, is good treatment in these cases. In emergencies, one, two or three injections of a sterile ampule of camphor solution in oil hypodermically at intervals of an hour will, at times, tide over cardiac depression. Alcohol may or may not be indicated, depending on whether or not the patient can take other nourishment. It should not be used as a stimulant, and the dose should not be

large. Whether ergot or hydrastinin should be given must be decided in each case. The ergot will improve the tone of the circulation, but may cause the uterus to contract more than is desirable. Digitalis should not be used except, perhaps, early in the disease, as the inflamed or injured myocardium which results from an infection must not be hurt by the strong contractions which are caused by this drug.

Fowler's position should be maintained to promote drainage, often with the use of uterine retention tubes, and the Murphy drip may be advisable.

The diagnosis of a streptococcic infection having been made, the choice of one or more of the following specific treatments are available:

1. Antistreptococcic serum.
2. A stock streptococcic vaccine.
3. An autogenous vaccine developed from the uterine secretion.

Antistreptococcic serum has in some hands shown wonderful results; in other hands it has failed. It should be used, if at all, in large doses, as it does not seem to do any harm. It often, however, is not at all antitoxic to the bacterial infection from which the patient is suffering.

If vaccines or bacterins are to be used, they should be used early, and the stock vaccine selected must be polyvalent, that is, it must represent several strains of streptococcus, with the hope that one of them will be the one that has infected the patient. Later, these vaccines are not valuable, as then enough of such stimulation is going on in the patient. Therefore, in the advanced or later stages of the infection an antistreptococcic serum, if it were antitoxic to the germ from which the patient is suffering, would be of great value.

If an autogenous vaccine is to be used, it should be produced early in the infection (such a bacterin, in emergencies, can be developed in from eighteen to twenty-four hours) and immediately given. More than one or two repetitions of such an autogenous vaccine at twenty-four-hour intervals would be doubtful therapy, as in an acute infection such as puerperal epticemia the blood is soon producing all of the anti-

bodies that it can. This is a very different process from a slow-going acute or chronic infection in which revaccinations are often of great value.

As these infections are not malarial, unless a malarial germ is discovered in the blood, there is no excuse for administering quinin. If the diet is without meat, iron should be given, and is, perhaps, best administered in 5-drop doses of the tincture of ferric chlorid in fresh lemonade, given three or four times in twenty-four hours. Also the need of the body for lime should not be forgotten and simple lime-water may be used, or calcium glycerophosphate, in powder, in 0.3 gm. (5 grain) doses, three times daily.

If more or less serious uterine hemorrhage occurs, or if the discharges from the vagina are exceedingly fetid, showing decomposition products in the uterus, it may be necessary to institute some operative interference. Perhaps the safest procedure is to administer an anesthetic and to explore and clean the uterus with the finger properly protected. Curettage of an infected uterus is serious and may cause serious results, to say nothing of the danger of perforating the softened uterine wall. It may be repeated that except for serious hemorrhage it is probably rarely advisable to clean out the uterus during septic infection. Decomposition will generally cause a loosening of foreign and pathologic tissues from the walls of the uterus, and they will generally be passed out through the vagina. Also, it should be remembered that in this septic infection the uterine muscle itself is more or less inflamed and softened, and contains, as well as the surrounding lymphatics, more or less of the infecting germ. Also, when the infection is well in progress the bacteria are probably in the blood. Severe local measures, therefore, do not eradicate the disease and may open up other avenues of absorption. It may even be wise, in the presence of uterine hemorrhage, to pack the vagina first to see if the loosening membrane or piece of placenta will come away without actual uterine interference.

It should be urged that intra-uterine injections and douches are rarely, if ever, indicated, are generally dangerous and may do serious harm. Vaginal

douches in septic infection, while not so dangerous, may also cause harm and should generally be omitted. In other words, the pressure in the uterine and vaginal cavity should always be negative to the pressure on the other side of the blood-vessels and lymph-vessels to promote exudation into the parturient canal rather than absorption from this canal. There is danger, also, in intra-uterine injections of forcing septic matter into the fallopian tubes. If, later, a pelvic mass is found, whether hematoma or abscess, hot vaginal douches may be allowable and of value in promoting absorption or in hastening localization for vaginal incision and evacuation.

If there is more or less peritoneal inflammation and, therefore, pain, morphin is indicated, as a patient should not be allowed to suffer pain, for depression from acute pain may be the last straw to stop an already weakened heart. Local applications to the lower part of the abdomen in the shape of turpentine stupes or alcohol fomentations may sometimes be of value as counterirritants. Warm applications, as flaxseed or poultices, may give some comfort and prevent the necessity of giving much morphin. They often cause a relaxation of the muscular tissues and lessen the irritation and tension. Of course such treatment is purely symptomatic and entirely non-specific. If serious infective localization occurs in the pelvis, more serious operative interference may be necessary.

In recovery from this very dangerous infection the convalescence is long and tedious, and months generally elapse before there is a return to normal health.

SUMMARY

Hirst, Dickinson and De Lee, constituting a committee appointed by the Section on Obstetrics, Gynecology and Abdominal Surgery, of the American Medical Association, reported (*Jour. A. M. A.*, 1914, Oct. 25) to investigate the treatment of puerperal fever, sent out a series of questions to surgeons and obstetricians, in this country and abroad, covering the principal exigencies liable to be encountered in puerperal infection. These replies to the questionnaire give a definite

idea of the practice of the respondents and fairly represent the best prevailing views obtainable, and in forming their conclusions due weight was given them. The conclusions deduced from the inquiry are given as follows: "The majority of accoucheurs and surgeons clean out the septic uterus at once, but a not negligible minority believe it is safe to trust the expulsion of the infected uterine contents to the powers of Nature, some assisting the same by mild measures such as antiseptic douches and packing. From this it is fair to infer that, in the majority of cases, it has been found safe to invade the infected uterus with finger and curet, and this is borne out by experience. There are, however, many cases in which the infection is of such a nature, or the resistance of the patient of so poor a quality, that the sudden introduction into the system of so large an amount of bacteria and toxins as is always made by curettage, turns the scale against the patient. She cannot stand the inoculation with auto-genous vaccines. The experience of the minority has proved that ovular remnants, even though infected in the uterus, do not create such dangerous conditions as we formerly believed, demanding instant removal, but that it is safe to wait for Nature to erect her own barrier against the progress of the infections, and that temporizing measures or mildly stimulating ones often suffice for cure. We all feel the need of some method by which it would be possible to distinguish benign from virulent bacteria living in the genitalia, but as yet no such method exists. When it does become possible, our practice will become more definite. At present one-half of the authorities do not try to make the distinction, holding it impractical. One point that was almost invariably emphasized was that after the uterus was once emptied it should not again be invaded by either finger or curet. Few would permit antiseptic douches. This is a very grateful change from the time when repeated curettages were performed on the puerperal uterus—a procedure which was as rational as curetting the throat in diphtheria. Another interesting fact that has developed is that quite generally the tampon is used to stop the bleeding in

infected cases. Evidently there is not much fear of damming back the infection and permitting greater absorption."

POSTPARTUM HEMORRHAGE

This subject was fully considered several years ago in a symposium in the *New York Medical Journal*. The facts there brought out are basic however, and worthy of frequent repetition.

ETIOLOGY

The causes in general may be summed up as: Those which interfere with uterine contractions or cause relaxation of the uterine muscle; lacerations of the parturient canal, and partial or complete retention of the placenta. The management of the condition presents practically nothing new, viz: Administration of ergot; removal of uterine contents; repairs of lacerations; massage of the uterus; hot intra-uterine douches; packing the uterus.

PROPHYLAXIS

Avoid precipitate labors. Avoid protracted labors. Avoid a surplus of anesthesia in slow labors; chloral (one gram, repeated in an hour if necessary) is preferable. If there is history of hemophilia, give calcium chlorid for three months prior to delivery. At the onset of labor see that the bladder and rectum are empty, and as soon as the head is born ergot should be given (preferably by the hypodermic syringe), and the fundus massaged to stimulate contractions. Pituitary extract may be given cautiously.

If hemorrhage begins during the period between the birth of the child and the expulsion of the placenta, and without evident relaxation of the uterus, it may be due to a partial separation of the placenta or to the fact that the placenta is separated but still within the uterus.

TREATMENT

Hemorrhage immediately following the birth of the child may be from the circular artery of the cervix; from a lacerated vagina, or from a lacerated perineum.

In such cases, with the use of the speculum and a constant stream of water to wash away the flowing blood, immediate repair of the laceration is usually easy, and correctly placed stitches will stop the hemorrhage.

If the bleeding does not amount to much more than oozing, swabbing with epinephrin solutions may be effective.

The Credé method of expulsion of the placenta will usually stop the flow by removing the obstacle, and will stimulate the uterus to contract. Failing thus to remove the placenta, the necessity of manual removal should be considered.

The placenta having been born, if the hemorrhage continues and the uterus is soft and flabby, contraction of that organ is the end aimed at. This may be secured by continued manual stimulation from without and the use of pituitary extract.

If the hemorrhage still continues, Bryan, Philadelphia, advises the "bimanual manipulation," usually accomplished "by passing two fingers of the right hand high up into the vagina, along the posterior wall, pressing the lower segment and cervix forward toward the symphysis pubis, at the same time passing the fingers of the left hand deep in between the umbilicus and the uterus so that the hand on the outside, the fundus resting in the palm of his hand, may be pushed downward and forward against the pubes, thus forming a sort of temporary ante flexion."

When these methods fail, the next thing to do is to pack the uterus. The volsella forceps are preferable for this, as there is little danger that the cervix will contract so as not to admit them, and the ordinary uterine dressing forceps are sharp enough at their points to admit an element of danger from the possibility of their being pushed through the fundus. The packing may remain in the uterus for from six to twenty-four hours, and when it is removed another packing should be ready to replace it, if necessary.

UTERINE HEMORRHAGE

The causes of uterine hemorrhage are numerous and must be ascertained before actually scientific treatment may be undertaken.

ETIOLOGY

It appears desirable to Whitehouse, (*Lancet*, 1914, April 4, p. 950) that a careful investigation of the discharge should be made in every case of obscure uterine bleeding. The points in the investigation to which special attention should be directed are: 1. The presence or absence of thrombi within the vagina. 2. The formation of thrombi within the discharge after the fluid has been allowed to stand. 3. The thrombolytic power of the secretion. 4. The calcium content of the same. 5. The microscopic characters of the deposit obtained after centrifugalization of the fluid collected directly from the uterine cavity in order to obtain an index of the degree of tissue destruction. Six hundred and eight cases were analyzed by Whitehouse.

It was evident that displacements of the uterus do not directly produce excessive uterine hemorrhage. In cases in which hemorrhage was present it was not shown that the displacement was more acute than in patients in whom no bleeding was present. On the other hand the proportion of irregular bleeding was considerably greater in the complicated cases than in those that are simple. With prolapsus uteri it was found that but few cases showed evidence of excessive bleeding.

Fibrosis and chronic nephritis was in a very large proportion of cases associated with uterine bleeding. Hemorrhage in cases of fibrosis uteri is probably due to two factors: (a) changes in the endometrium, and (b) loss of contractility of the metrium owing to its replacement by fibrous tissue. Out of a total of seventy-three cases of endometritis fifty-six were associated with menorrhagia and twenty-nine with metrorrhagia. A thorough investigation of the cases classed clinically as "endometritis" showed that sixty-one of the patients were married, and of these forty-three directly attributed the irregular hemorrhages to the last labor or abortion at intervals varying from three months to one year. The irregularity, in fact, dated from the resumption of function. Examination of the curettings revealed the following facts: (a) twenty-five cases showed what in the past was design-

nated "glandular endometritis"; (b) nine cases showed all the characteristics of the so-called "interstitial endometritis" of Ruge's classification; (c) atrophic "endometritis" was present in two; (d) plasma cells and marked leukocytic infiltration appeared in seven. In other words, thirty-four exhibited only evidence of those changes known to be but physiologic, and therefore could not be classed as "endometritis." Endometritis of septic origin does not appear to produce uterine hemorrhage.

Hypertrophy of the endometrium, in its diffuse form, occurs under the name of "glandular hypertrophy"; its localized variety is the common "adenomatous polypus." Hemorrhage is usually profuse and appears to be due to excessive thrombolysis of the uterine clot. Cystomata of the ovary rarely cause interference with the menstrual function. Displacements of this organ as a general rule do not produce excessive uterine hemorrhage. Hypertrophy of the ovary affects the stroma rather than the Graafian follicles, and the close association of the condition with hypertrophy of the endometrium appears to afford clinical evidence that it is from the ovarian stroma that the specific hormone is derived.

Pelvic inflammation is not infrequently associated with excessive hemorrhage from the uterus. Whitehouse is inclined to think that the hemorrhage is the result of interference with venous return rather than to any specific effect either on endometrium or ovary, since it occurs not only in connection with inflammatory lesions related to the sexual organs, but also in cases secondary to extragenital inflammation, such as appendicitis.

The value of curettage in the therapeutics of uterine hemorrhage Whitehouse says is principally for diagnostic purposes. If the examination of the curetted endometrium is taken in conjunction with an analysis of the menstrual discharge, and care taken to correlate the appearances of the endometrium with the period of the sexual cycle, much valuable information may be gained as to the cause of a specific hemorrhage. Curettage at the two extremes of sexual life is, in his opinion, a useless procedure except for diagnostic

purposes. It is not possible to alter the character of the endometrium by any amount of curetting. This is proved by examination of repeated curettings from the same uterus, and it accounts for the fact that in glandular hyperplasia of the endometrium curettage is only of temporary benefit.

TREATMENT

A summary of recent views as to the treatment of uterine hemorrhage yields universal agreement as to the necessity of making every endeavor to treat the cause.

Adler (*Med. Klinik*, 1914, x, p. 183) believes that palliative measures should never be applied in the treatment of uterine hemorrhage until after malignant disease has been positively excluded. With extra-uterine pregnancy, the course is generally either that after a normal menstruation of the ordinary four-day type the following menstruation is retarded several days and then extends over a week or more, or it may occur a few days before the regular period and keep up for two weeks or more, or it may commence at the regular period but keep up for a long time. The hemorrhage is less profuse than at an ordinary menses but it keeps up for days and weeks without interruption, and there is slight discomfort or pain in the side of the abdomen. Conservative treatment is entirely out of the question when extra-uterine pregnancy is once certain, he declares. His research has confirmed the assumption that endometritis has nothing to do with uterine hemorrhage; the uterus proper is seldom responsible for the hemorrhage; the ovaries or reduced coagulating power of the blood, the effects of constipation, tight lacing, a sedentary mode of life, abnormal sexual excitement or emotional stress are more likely to be the factor or factors involved, inducing irregular menstruation or prolonging and exaggerating normal menses. Local treatment of the uterus has therefore lost ground in favor of causal measures; the curet has lost its vogue since it has been shown that it had a curative influence in only 10 per cent. of 500 cases of uterine hemorrhage compiled by Busse. Mere bed rest alone may control uterine hemorrhage

in women nearing the menopause and in young girls. In other cases a change of climate by improving the general health has cured the tendency to hemorrhages. Out-of-door life at a moderate altitude, saline and chalybeate baths may prove useful while mud baths often have a directly injurious action. Keeping the bowels open by proper dieting is of the greatest importance.

CURETTAGE

As reiterated by Whitehouse, Adler and many others, the use of the curet in the treatment of uterine hemorrhage is losing vogue. If bleeding is due to excessive thrombolysis, the result of hyperplasia of the endometrium, temporary relief may be obtained, however, by curetting. Curetting helps in some cases, perhaps, by inciting the uterus to vigorous contractions, which put an end to venous stasis by which the hemorrhage may have been maintained.

BLOOD, SERUM AND FERMENTS

Where hemorrhage is due to the absence of thrombo-kinase attempts may be made to replace the same. Fibrin ferment directly applied to the endometrium is also of service in directly checking hemorrhages of this nature. Curtis (*Jour. A. M. A.*, Jan. 23, 1915, p. 332) found that repeated subcutaneous injection of whole blood immediately on a withdrawal from a healthy donor, obviated the need of further treatment in many cases of uterine hemorrhage.

ROENTGEN THERAPY

The Roentgen rays have proved useful in the treatment of bleeding myomas. Adler says it must be continually borne in mind that they act only on one symptom, the hemorrhages; the symptoms from traction by adhesions or pressure on adjacent organs are not influenced, and the danger of cancer is present in from 5 to 10 per cent. at least of all cases of uterine myoma. If roentgenotherapy is applied it should be only under the constant control of the gynecologist. Adler remarks of radium treatment that the dangers from it are so great and it is so impossible to reckon

with them beforehand, that this method of treatment cannot even be suggested for uterine hemorrhage.

MEDICAL TREATMENT

According to Thielhaber (*Archiv. f. Gynäk.*, 1914, No. 1, abstr. *Jour. A. M. A.*, 1914, March 21, p. 972), tonics and calcium may be given. Ergot often is beneficial, taken before and during the menses, keeping this up for months. Local injection of ergot or hypophysis extract may also help in arresting a hemorrhage. Systematic scarification in the period preceding the menses has also rendered good service in his and Fütth's experience. He has applied cauterization about 25,000 times, during the last thirty years, and has never had a serious mishap with it. He regards acute and subacute gonorrhea as a contraindication, but has applied the caustic a number of times in chronic gonorrhea when it has kept up for a year or two. He used to apply a 30 per cent. solution of zinc chlorid, but has lately changed to a 30 per cent. solution of formaldehyd, applying it on a cotton-wound sound.

Gerstenberg (*Zentralbl. f. Gynäk.*, 1914, xxxviii, p. 1201) uses a solution containing 40 parts formaldehyd in 60 parts of water to paint the uterine mucosa to arrest climacteric hemorrhage, and has never had any mishaps with it. It advantageously substitutes for or supplements curetting or roentgenotherapy while it is far superior for numerous reasons to atmocausis or zinc-chlorid applications. He even affirms that if uterine hemorrhage in women of 40 to 50 is not arrested by two formaldehyd applications in this way, some special cause for the hemorrhage is more than probable. The trouble generally proved to be myoma in his cases; in one the myoma prevented the formaldehyd from reaching the mucosa above it. He applies the formaldehyd for fifty seconds altogether and uses two sounds at once.

Sehrt found pronounced hypofunction of the thyroid in numerous cases of uterine hemorrhage. Following the administration of the various preparations of thyroid, he found that not only the hemorrhages but the general health became markedly improved.

Focke has called attention to the fact that in uterine hemorrhage without organic basis digitalis is of great aid in addition to local measures which are applied.

It is particularly useful in hemorrhage during a pregnancy, and in recurring menorrhagia in the young and in the elderly; in short, in all cases in which the uterus is apparently sound and some disturbance in the circulation causes a tendency to transient congestion and spontaneous (essential) bleeding. He has prescribed digitalis for uterine hemorrhages in 100 cases during the last fourteen years and here analyzes fifty of them. When the uterus was diseased there was not much effect from the drug, but it proved invariably effectual in his twenty-nine cases of excessive or too frequently returning menstrual hemorrhage. In these cases he commences the digitalis a week before the anticipated menstrual period.

DYSMENORRHEA

The treatment of dysmenorrhea should, of course, vary with the indications as based on the underlying condition. Cases should be analyzed as to the existence of defective development of the genital organs, abnormal ovulation; in some cases the cause must be sought in the glands of internal secretion, especially the thyroid; in some instances, dysmenorrhea is associated with puerperal bradycardia and arrhythmia. The condition known as vagotony may be at the basis of the menstrual pain or local or radiating neuralgias may be responsible. In still another class of cases spasmodic contraction is the source of pains; defective development of the uterus may be the basis for this or it may be maintained or aggravated by pain in the ovaries. The spasm may be more painful when there is any mechanical hindrance to distention of the ovaries and uterus during menstrual congestion.

Mosher believes that dysmenorrhea is largely a functional disorder, congestive in type and produced by (1) the upright position; (2) alteration of the normal type of respiration by disuse of the diaphragm and of the abdominal muscles; (3) the lack of general muscular development; (4) inactivity during the menstrual period; (5) psychic influences. She shows

how the upright position with the valveless vena cava causes uterine congestion which tends to become exaggerated when the abdominal muscles are lax, when costal breathing is employed and by clothing, which interferes with the action of the respiratory muscles. Mosher has corrected these conditions in many cases by the following method: "All tight clothing having been removed, the woman is placed on her back, on a level surface, in the horizontal position. The knees are flexed and the arms placed at the sides to secure relaxation of the abdominal muscles. One hand is allowed to rest on the abdominal wall without exerting any pressure to serve as an indicator of the amount of movement. The woman is then directed to see how high she can raise the hand by lifting the abdominal wall; then to see how far the hand will be lowered by the voluntary contraction of the abdominal muscles, the importance of this contraction being especially emphasized. This exercise is repeated ten times, night and morning, in a well-ventilated room, preferably while she is still in bed in her night-clothing. She is cautioned to avoid jerky movements and to strive for a smooth, rhythmical raising and lowering of the abdominal wall." The results have been that the pain has been lessened in many cases and wholly removed in a large number. The desirability of more activity is noticed but she cautions against excess, especially in the athletics of college training. A hopeful mental condition is important, and it is unfortunate that pain or disability is so commonly expected.

In those types of dysmenorrhea due to vagotony, when the autonomic nervous system is in a state of hypertonicity, the pronounced spasticity from overstimulation of the vagus brings on pain at menstruation and atropin wards this off or cures it. In small doses atropin has a stimulating and in large doses a paralyzing action on the sympathetic nervous system, and instances of failure to relieve the dysmenorrhea are probably due to incorrect dosage. Atropin arrests the pains by paralyzing the nerve terminals belonging to the vegetative nervous system. The menstrual discharge increases in amount after taking

the atropin, possibly from relaxing the spasmodic contraction of the vessels or of the uterus or both. Papaverin also has a paralyzing action on the smooth muscles, and may prove useful in combating dysmenorrhea. On account of danger of hemorrhage from atony of the uterus, atropin is necessarily contraindicated when abortion or delivery is once under way and there is considerable uterine hemorrhage.

In a certain proportion of cases Stolper found atropin ineffectual. In every one of these there was a blood pressure higher than normal. If the blood-pressure is abnormally high there seems to be no use in giving atropin; treatment must be directed to reducing the blood-pressure, and cause must be sought and removed. It very frequently is found in the pelvis, a tumor or inflammation in one of the genital organs or chronic constipation causing local disturbance in circulation. When the cause is removed the blood-pressure becomes normal and the dysmenorrhea either is conquered or then becomes amenable to atropin.

Dalché (*Revue Mens. de Gyn., d'Obstét. et de Péd.*, 1914, viii, p. 641) discusses the use of thyroid and ovarian extract in dysmenorrhea. He believes that when no definite cause may be found a course of thyroid treatment may restore the balance between the internal secretions. He has frequently found it effectual in regulating menstruation, increasing the menses to normal proportions and without abnormal pain. He gives small doses of pulverized thyroid, 0.025 to 0.05 or even 0.1 gm. a day, keeping this up for a month or more to get the full benefit of its stimulating and regulating action on the functioning of the ovaries. The patient must be kept under close supervision during the course, suspending the organotherapy if the pulse goes over 100, or at least materially reducing the dosage. After the first month he has the thyroid treatment continued only during the ten days preceding the date of menstruation. Sometimes he has found it better to alternate ovarian and thyroid treatment, thyroid in the morning and ovarian tissue at evening, or giving the ovarian treatment continuously for three days and then the thyroid continuously for the same

length of time and then resuming the ovarian treatment.

He has never had any mishaps with this treatment and has been more successful with it than ever before in the management of dysmenorrhea. The only disadvantage is that it generally has to be kept up for months or resumed occasionally to obtain durable improvement or a complete cure.

GENERAL TREATMENT

To relieve the pain during dysmenorrhea, a rectal enema of sodium bromid may be given. Dalché uses laudanum and antipyrin in small dosage as a rectal enema, the ratio being 10 of laudanum to 1 of antipyrin. Relief may be obtained from hot applications on the feet, front of the legs and inner side of the thighs, with moist heat to the abdomen. Sedative liniments and pomades may also prove useful or even a blister. The patients should guard against constipation, lead a quiet life and keep in bed during the menstrual period. It is a frequent experience that if by vigorous means it is possible to ward off the pain with menstruation once, twice or three times in succession, the tendency to dysmenorrhea seems to be broken up and menstruation proceeds normally thereafter.

STERILITY IN WOMEN

The treatment of sterility has, according to Reynolds (*Jour. A. M. A.*, Oct. 11, 1913, p. 1363), long been one of the comparative failures of gynecology and he has been struck with the frequency with which women sterile to normal husbands have nevertheless been pronounced normal themselves, even by recognized authorities. He has seen this repeatedly in cases where in his opinion a fully adequate cause existed in the genital organs, treatment of which resulted in prompt fertility. The causes of sterility in women may be classified under two heads: Disorders of the secretion of the genital mucosa which are destructive to the continued life of the ova or spermatozoa or annul the active motility of the latter; second, conditions in the ovaries inhibiting the formation of the ovum or preventing its release at maturity. The normal secretion

may be altered by disease or there may be fermentative or other changes in the secretion given out by a normal mucous membrane. It is only by close observation of these secretions that the cause of the sterility can in these cases be discovered. A secretion of any one of the parts of the genital tract is most likely to be harmless to those above it, but an alteration of an upper secretion almost necessarily implies a similar abnormality of the secretions below into which it passes. Secretions in the patent vagina are rarely absolutely normal, but the importance of the condition must be estimated differently in the nulliparae, who form most of the subjects of sterility, and in the multiparae. A cause efficient against conception in the former may have no effect in the latter, owing to the slightly alkaline secretion of a lacerated cervix and the greater facility of the entrance of the spermatozoa. The most common causes of the alterations of the cervical secretion alone are retention and consequent thickening of the secretion behind a pinhole os. As regards the uterine secretion, which largely depends for its normality on the free drainage, so long as it is thickened, clouded, mucopurulent or seropurulent, there will be no pregnancy. It is not generally realized that the fallopian tubes have a secretion, but this must be inferred from their structure. Remembering that they are morphologically a part of the uterus it would seem it must be so. Reynolds considers that besides a regular salpingitis there may be many minor conditions which might affect the tubal secretion. The existence of ovarian infertility has long been accepted as possible. The alterations that are most common in sterility cases are slight to moderate enlargements caused either by the presence of numerous small to medium sized retention cysts, or of unduly large, persistent, and frequently cystic corpora lutea. The claim that bilateral enlargement of the ovaries by retention cysts is a cause of sterility cannot at present be proved, but the importance of persistent corpora lutea is better established. He has in his records cases of this kind and veterinary practice has recognized it in cows. As regards treatment the alterations of the vaginal secretion are apparently always due to infection, with the exception of

profuseness, from general pelvic congestion or of those hyperacidoses from a general constitutional acidosis. Treatment naturally follows along the lines indicated by these etiologies. In alterations of the cervical secretions we should include the ordinary typical applications and perhaps curetting, but always the complete drainage of the cervical cavity. Any constriction should be done away with by operation if necessary. The only two methods of treating the uterine mucosa needing mention are curetting and disinfection and these are difficult to perform with thoroughness. Complete drainage by plastic work if necessary is essential and mere dilatation is inefficient. At the base of the whole subject lies the principle that even the ovarian infertilities are almost invariably associated with physiologically obstructive conditions, minor or major, and the patency of the genital canal is only that of its most obstructed point. This is not the mere mechanical patency, but that more complicated physiological patency allowing the conjugation of the germs and the subsequent growth which may be affected by such minute alterations that they escape diagnosis under merely routine observation.

ASPHYXIA NEONATORUM

This condition is one which every obstetrician should be prepared to treat promptly. In milder degrees it occurs in a large proportion of deliveries. In its more severe forms it fortunately is less common.

The more common causes of the condition are premature detachment of the placenta, prolapse of the umbilical cord, excessive use of chloroform, of chloral, or of morphin administered to the mother to diminish the pain of labor, or large doses of ergot given during the second stage of labor to increase the contraction of the uterus, extreme compression of the head of the child owing to the unusually severe contractions of the uterus separated by brief intervals, obstruction to the passage of the head by narrowness of the pelvis, compression of the head by unskilled delivery with forceps, compression of the after-coming head in the delivery of breeches cases, and compression of the cord

through its being wound around the child's neck, or through its being drawn into a knot.

PREVENTION

The preventive treatment naturally is based on a consideration of these causes. In instrumental delivery great pressure on the head of the child should be avoided, and the traction should be made intermittent and not continuous. If there is prolapse of the umbilical cord, it should be replaced, the woman placed in the knee-chest position, and every effort made to retain it until the head has become engaged in the brim of the pelvis. In all severe labors preparation should be made before the birth of the child to apply suitable treatment in case it should be born in a condition of asphyxia. These preparations should include a baby's bath tub with a supply of warm water conveniently at hand, a bowl of cold water, a warm woollen blanket, a small piece of gauze, and a hypodermic syringe.

As soon as the child is born it should be promptly slapped repeatedly on the buttocks and back. The mouth and throat should be wiped out with a piece of gauze so as to clear out any blood, mucus or amniotic fluid which may be there. If this does not promote the reflex action of breathing, the cord should be felt to see if it is pulsating.

By this time one has had an opportunity to inspect the surface of the child to see whether the condition is one of *asphyxia livida*, in which the skin is congested and livid and the reflexes are maintained; or whether the condition present is *asphyxia pallida*, in which the surface is pale and cold, the muscles are relaxed, and the reflexes are absent. The treatment should vary somewhat according to which of these two conditions is present.

ASPHYXIA LIVIDA

If the condition is one of *asphyxia livida*, with congestion of the skin, there is some difference of opinion as to whether the cord, if it is pulsating, should be at once cut and a small amount of blood allowed to escape, or whether it should not be cut until later. Probably it is wiser to postpone this for five or ten minutes. In the meantime the child should be grasped by its feet

in the left hand of the physician and held in an inverted position while several light blows are administered on the buttocks, shoulders and chest, in order, if possible, to expel any more blood or mucus which may be in the larynx and trachea. This position should be maintained for only a few seconds.

ARTIFICIAL RESPIRATION

Next, the Byrd Dewey method of artificial respiration should be tried. This consists in placing the palm and fingers of the right hand under the child's shoulders, while the index finger and thumb support its head, the left hand being placed under the hips. With the child in this position, by raising the radial sides of the hands, the legs and knees of the child are brought up onto its chest and the chest is compressed so that the air is expelled; then reversing this position and allowing the head and shoulders to fall backward, the chest is expanded and the air drawn in. These maneuvers should be repeated at intervals of about five seconds, so that the procedure will be repeated from ten to fourteen times in a minute. If the cord is of average length, this can be done before the cord is cut.

If the cord has not been cut before, it should be now, and the child at once placed in a tub in which water of a temperature between 100 and 105 F. has been placed. This will promote the circulation in the skin and prevent the body from being chilled, and further treatment may be carried out.

The next method of encouraging respiration is that known as the method of Laborde. This consists in grasping the tip of the tongue either with the thumb and finger, with the aid of a piece of gauze, or with forceps, and drawing it forward and then letting it fall backward. This should be repeated from ten to fourteen times a minute, and may be continued for one or two minutes. While this is being done the child should lie with the head drawn slightly backward, or on one side.

If the child does not breathe by this time, it is well to take it out of the warm water and plunge it into a bowl of cool water of a temperature of from

65 to 75 F. It should be allowed to remain here but a few seconds, and then placed back in the warm water. In the meantime it should be vigorously rubbed, but at the same time caution should be used not to rub it harshly for fear of doing serious damage to the skin.

In some cases it has been found that inserting the tip of the little finger into the anus will stimulate the reflex action of breathing.

Another method not infrequently employed is that known as the method of Schulze, which consists in standing back of the child, placing the palmar surfaces of the three outer fingers under its shoulders, the index finger of each hand under the axilla, and the thumbs on the chest, with the ball of the thumb resting on each side of the child's head. The physician thus grasping the child and then standing erect, gradually swings the child forward and upward in front of himself until it is above his head. In this position the child's thighs and legs fall against its chest, which is thereby compressed and the air forced out. Then swinging the child back into the original position, the chest is expanded, and the air enters. This may be repeated at intervals of five or six seconds, so that it will be done from ten to fourteen times in a minute. This is a method which presents more or less of the appearance of violence, and hence it is not always practicable to do it in the presence of the friends of the patient. It should also not be practiced if there are fractures of any of the bones, or if the child is especially feeble, or has been born prematurely.

If difficulty has been experienced in clearing the larynx and trachea of mucus, a small soft catheter may be inserted through the larynx into the trachea, and any mucus present drawn out, either by the physician himself or with the aid of a syringe or aspirator.

If other methods fail, it is recommended to blow air into the lungs of the child. This may be done by the so-called mouth-to-mouth method in which, a piece of gauze being placed over the mouth of the child, the physician filling his cheeks with air expels it into the mouth of the child, at the same time holding the child's nose. This method is somewhat inexact, as

much of the air frequently goes into the stomach, but some of it goes into the lungs, if they are not already distended. After blowing air into the lungs, the chest should be compressed so as to drive it out again.

An effective method of resuscitating asphyxiated infants is that of Meltzer and Auer, by tracheal insufflation. A rubber catheter is passed into the trachea as far as the bifurcation and air is pumped into the lungs by means of a rubber bulb, the pressure being regulated by a mercurial manometer connected with the apparatus. The return air escapes alongside the catheter.

A few drops of ammonia on a piece of linen may be held under the child's nose, but not too closely, with the hope that this will stimulate respiration and, as it sometimes does, muscular contraction. A hypodermic injection of a drop of tincture of belladonna or 1/1,000 of a grain of strychnin may be given.

If by the time all these methods have been tried the child has not commenced to breathe, the physician naturally wonders how long he ought to continue his efforts. The answer to this question depends largely on the condition of the heart. He should continue his efforts at artificial respiration and external stimulation as long as the heart beats. After it has been impossible for five minutes to detect any pulsation of the heart, it is useless to continue any further efforts at resuscitation.

If the efforts have been successful and the child commences to breathe, even if the breaths are taken at long intervals, one should avoid an over-anxiety in interfering with the natural performance of the function by the child. Once it has begun to breathe it probably will continue to breathe and the breaths will increase in depth and frequency until they become normal.

ASPHYXIA PALLIDA

Turning now to the other class of asphyxia neonatorum, viz., *asphyxia pallida*, in which the reflexes are absent and the heart is weak; if the cord is not pulsating, it should be immediately cut and the child placed in a tub of warm water. If, however, it is pulsating the child should not be separated from the mother until the pulsation has ceased. The same

methods are applicable in these cases as in the others, except that the more violent ones had better be omitted and all efforts concentrated on the employment of the milder methods, especially the rhythmical traction of the tongue as practiced by Laborde. Especially is it important to maintain the temperature of the child, and the water in the warm bath should be maintained at a temperature of 100 or a little higher by adding fresh warm water as fast as the water in the tub becomes cool.

After the child has gained the ability to breathe regularly it should be carefully watched for several days, for if there has been difficulty in relieving the asphyxia, there is danger that it will become feeble and die in the course of a few days. It should be well wrapped up, and the external heat should be maintained. The milk should be drawn from the mother's breast and fed to it with a medicine dropper, if it is not able to take hold of the breast and draw for itself.

DISEASES OF INFANCY

INFANT MORTALITY AND FEEDING

The amount and extent of infant mortality have been estimated in various ways. In general, all seem to agree that approximately 15 per cent. of all children born die before they are 1 year old. As to the causes of fetal mortality, Williams (*Jour. A. M. A.*, Jan. 9, 1915, p. 95) analyzed 705 fetal deaths which occurred in 10,000 consecutive admissions to the obstetrical department of Johns Hopkins Hospital. Included in this list are all those who died immediately after birth up to those who lived two weeks and died. Of this class syphilis was responsible for 26 per cent.; unknown causes, 18 per cent.; dystocia, 17 per cent.; various unpreventable complications as hemorrhagic diseases, cord infection, status lymphatics, strangulation by loops of cord, about 11 per cent.; prematurity, 7 per cent.; toxemia, 6.5 per cent.; deformity, inanition, criminal suffocation, placenta praevia, etc., all less than 5 per cent. The cure for this type of infant mortality is proper prenatal care. This prenatal care means that the physician must examine his cases, make regular urine examinations, see that the expectant mother secures a proper diet, correct and sufficient exercise and a proper hygiene.

Approximately one third of the deaths during the first year are due to congenital malformations, deformities and weaknesses; another third to diarrheal diseases; a little less than one fourth to respiratory and tuberculous diseases; and the remainder to other diseases.

It is toward the diminution of the number of deaths from diarrheal diseases that preventive efforts are conspicuously directed. A very large proportion of these deaths occur during the hot weather, between July 1 and October 1, and are directly traceable to improper feeding and improper food. Hence arises the great importance of the problem of feeding the infant.

When the fact is recalled that the milk of different animals varies in composition, it is not necessary at the present day, and in the present advancement of scientific knowledge, to enter on any argument to attempt to prove that the milk of the human mother is the very best food for the human infant during the early months of its life. Every woman, therefore, who gives birth to a living child, unless she is suffering from some serious disease, should nurse her child. This course is not only decidedly advantageous to the mother, but is also of the greatest importance to the child.

BREAST FEEDING

No artificial method of feeding has ever been devised which is as beneficial as nursing at the breast of a healthy mother. Unfortunately, many mothers object to performing this duty on various grounds; some because they have sore nipples and nursing is painful; others because the baby will not take the nipple, and therefore is given a bottle instead; others because they think that their milk is not adequate in quantity or of sufficiently good quality to properly nourish the baby; others because they think that their health is being undermined by the drain on the system incident to lactation; and still others because they are unwilling to give up social pleasure so as to be available to nurse the baby every two or three hours. All these conditions should be taken into account by the physician, and such as are present in any individual should, if possible, be removed. He should emphasize to the mother the great importance, both to herself and to her baby, of providing the natural food from her own breast for her baby. He should also give explicit directions to the nurse in regard to the care of the breasts and nipples so that the latter may not get sore, a condition which not infrequently is accompanied by serious diminution of the flow of milk.

The young, inexperienced mother needs to be instructed, according to Abt (*Detroit Med. Jour.*, February, 1915), in the most elementary details concerning nursing. She is shown how to retract the parenchyma of the breast from the nipple so that the infant's nose will not be buried in the mamma and respiration

will not be constricted in this manner. If she trains the baby to grasp the areola as well as the nipple, the milk flows more freely and the nipple is less liable to be traumatized and rendered painful. The nipples should be kept scrupulously clean, and may be washed before nursing, using plain water. Other solutions as well have been advised, among them weak solutions of boric acid.

Craige (*Jour. A. M. A.*, Feb. 6, 1915, p. 502) has summarized a number of practical instructions regarding the nursing infant. The proper interval for feeding should never be under two hours. Carlson and others have shown that the onset of hunger in infants occurs in from two and one-half to three hours. The three-hour interval is apparently that approved by most authorities although a few good pediatricians insist that four-hour intervals are correct. A night feeding between 10 p. m. and 6 a. m. is ordinarily unnecessary.

The nursing mother should have exercise, plenty of rest, and be free of nervousness and worry. Too frequent feeding of the infant will result in continual dilatation of its stomach and in the production of dyspepsia. The proper correction of this dyspepsia lies with the mother. If necessary she may be given a tonic and constipation should be corrected with cascara or some mild laxative.

In the composition of the milk, the fats and proteins are the constituents apt to be at fault. In cases in which fat is too small in quantity, the mother should take cow's milk, cereals, red meat, and plenty of exercise, fresh air and sleep. Nursing should be less frequent when the fat percentage is too great. In such cases the child may have colic after feeding, it may have facial eczema, or seborrhea of the scalp; it vomits sour mucus, the stools smell sour and irritate the skin, and on staining with Sudan III particles of fat are visible in large quantity. The reduction of fat excess is difficult. The infant should, as has been stated, be fed less frequently. The diet of the mother should be modified to limit fat producing substances, the chief of which are the fats themselves. It may be necessary to feed only that portion of the breast milk containing small quantities of fat. The breast

pump may be used thus to eliminate the first or last part of the feeding to obviate undesirable surplus of any constituent.

If protein is the disturbing element, causing colic, constipation or diarrhea with mucus stools containing tough white curds, in shape of bean — or peanut-like masses, the mother is probably leading a sedentary life and eating much meat and eggs and highly seasoned food with lack of fruit and vegetables.

COLIC

In the foregoing, according to Craige, are found the causes, and, in a large measure, the prevention of colic. An attack of colic is unmistakable: the child cries violently, the abdomen is hard and distended, the knees are drawn up, and the hands and feet, which are never still, are cold from the intense intestinal congestion. The trouble may be either in the stomach, coming on soon after nursing, or in the intestines an hour or two later. Most mothers know all the mechanical remedies, such as hot applications, enemas, turning the baby over on his stomach, or holding him against her shoulder. It is often necessary to stop feeding entirely for twenty-four hours. Frequently, diluting the milk by giving water, lime-water, or barley-water, before nursing helps. Nursing a few minutes and stopping a short while, or the use of the nipple shield may be beneficial. Good results have been secured by Craige with peptonizing powder dissolved in warm water and given before each feeding. Carminatives, milk of magnesia, sodium bicarbonate, magnesium carbonate and bismuth subnitrate may often be used to advantage. In chronic cases, pulverized rhubarb or tincture of *nux vomica* sometimes gives relief. Sugar should never be used in the prescription for colic. Glycerin is a good substitute. In many cases the elimination of tomatoes, sour fruits and early vegetables from the mother's diet will prevent it. Where the condition has been long standing, improvement should not be expected to take place at once, for time must be allowed, both for the repair of the damage to the digestive tract, and more especially to the nervous system.

LACK OF MILK

When milk is insufficient in quantity the breasts are flabby, the baby does not seem satisfied. "Instead of nursing fifteen or twenty minutes and falling asleep, some fret and whine and pull at the nipple often for half an hour, while others give up entirely for a few minutes and then try again. The weight remains stationary or shows only a slight gain. There is no colic, no vomiting; the stools are scant, often with an olive-green tinge, and contain no undigested food. However, unsatisfactory weight may be the result of overfeeding as well as underfeeding. It should be remembered, too, that weight fluctuations are common in infants, just as in adults; therefore, the food should not be changed until it has been found that for two or three weeks there has not been an average weekly gain of from at least 3 to 4 ounces. With an abundance of good nourishing food for mother, regular habits for mother and baby, and mixed feeding, if necessary, in underfed babies, we always expect favorable results."

CONTRAINDICATIONS

Contrary to general opinion, menstruation is not a cause for stopping of nursing. Tuberculosis and a new pregnancy should be taken as sufficient cause. If milk is insufficient, breast nursing should be alternated with the feeding of correct milk mixtures.

INFLUENCE OF POSTURE ON DIGESTION

Smith and LeWald (*Amer. Jour. Dis. Child.*, 1915, April, ix, p. 261) have recently studied this important subject. It is their belief that air is swallowed with the food by many if not by all infants. The erect posture favors eructation of this air; the horizontal prevents it. The horizontal posture by preventing eructation, is an important cause of vomiting, colic, indigestion and disturbed sleep. The following routine should be followed in feeding every infant: Before feeding the infant should be held upright to allow the escape of any gas present in the stomach. Immediately after feeding the infant should again be held up against the shoulder of the mother or nurse. He may be patted on the back or gentle pressure may be made

on the epigastrium to encourage eructation of the swallowed air. It may be necessary to interrupt the feeding one or more times to hold the child upright to eructate, in cases in which an excessive amount of air is swallowed. After the gas is eructated the child should be put down to sleep, preferably in the prone position and with the head of the bed raised. If restless he may be taken up after a short time to see if there is more air in the stomach. Habitual tongue-suckers need to be held up several times between feedings, as they constantly swallow air. Other suckling habits must be prevented by mechanical restraint. Feedings should be given at as long intervals as possible, depending on the gastric capacity and the total daily requirements. A feeding should not be taken too slowly. From five to ten minutes are enough as a rule; fifteen minutes should be the maximum time at bottle or breast. The importance of posture and the wrong teaching given to physicians and nurses in the past warrant the emphasis laid on so simple a matter.

SUPPLEMENTARY FOODS

The choice of supplementary foods is a difficult problem. Cow's milk should be the basis, but when it fails, even after diluting, boiling or peptonizing, one should persist until sure that no food will agree as long as the baby takes the breast. As a temporary expedient, some of the ethical proprietary foods may be successful, especially when the fat content in mother's milk is high. Constipation is better controlled by mixed feeding than by any other means; give a bottle of cow's milk with a high percentage of fat, or some laxative food, or frequently milk of magnesia in one artificial feeding daily. After seven months it is best to use mixed feeding in all cases, Craige believes, with the idea of gradually training the infant stomach for the new food that weaning time will add. A 3 p. m. bottle without the nursing should be given, and later an additional one at 10 a. m. Frequently at about 6 months, the mother's milk begins to grow less, and the fat percentage high, and the baby shows signs of fat indigestion. Under such a condition a bottle of milk containing a low fat mixture should be given.

When from any cause the mother's health is impaired and the milk is consequently below the standard, the needs of the infant may be temporarily supplied by the addition of artificial foods, thus giving the mother time to recuperate.

WEANING

No age limit can be set for weaning. By one year a normal baby will wean himself, according to Craige, if gradually a bottle of milk mixture is substituted for breast feeding, and cereals, toast with butter, broth, beef juice and coddled egg are added, depending on the growth and development of the child. Should the weaning time fall during the summer months, however, it is best to continue the mixed feeding until cool weather. At 9 months the average infant weighs about 17 or 18 pounds. Few mothers have milk that will furnish sufficient nourishment for a child of this size. In the majority of instances, where mothers attempt to nurse their babies after 7 months, to the exclusion of other foods, they do so at the risk of grave malnutrition or rickets.

WET NURSING

If the mother cannot or will not nurse her own baby, the next best resource is a good wet-nurse. By this means the baby is supplied with human milk, and if the nurse is healthy, and was delivered at approximately the same date as the child's own mother, the substitute will usually prove very satisfactory. But practically, this method of feeding a baby is applicable to only a very limited number of the babies who are denied nourishment at their own mother's breast.

COW'S MILK

When human milk is unobtainable, the best substitute, from a practical point of view, is cow's milk, because it can generally be obtained in abundance in a more or less fresh state. Its composition is well understood, also the respects in which it differs from human milk. Like everything else in common use, it varies greatly in quality, and some of these variations are intimately associated with unhealthfulness. Years ago consumers were especially disturbed by the

abnormal proportion of water which many specimens of milk contained, and which was alleged to have been introduced surreptitiously by the producer or the dealer. This adulteration has largely been prevented by state legislation and the activity of local health boards.

With increasing knowledge of fermentation and putrefaction, and the relation of bacteria to these processes, it became evident that milk, although kept free from intentional dilution and contamination, readily underwent deleterious changes under the influence both of its inherent tendencies and of extraneous contaminating matters accidentally introduced into it. At present the most important cause of the deterioration of milk and the development of deleterious qualities in it appears to be the growth of bacteria. It seems to be practically impossible, even with the greatest care, to secure milk which is entirely free from bacteria, even when it is first drawn from the cow. Possible sources of contamination are dust and dirt in the air of the barn or dairy, and manure and other dirt loosely adherent to the hair of the cow, the hands and the clothing of the milker, and utensils used in the transportation of the milk.

It would consequently appear that the work of extracting the milk from the cow should be conducted in the same way as an aseptic surgical operation.

1. The barn, or whatever place is occupied when the cow is milked, should be constructed so that it can be readily and thoroughly cleaned, and it should be cleaned at short intervals. This will be accompanied by a diminution in the amount of dirt and dust and bacteria in the air, and so the amount of contamination is diminished.

2. The milker, whether milkmaid or milkman, should wear clean clothing and have his hands cleaned by careful washing.

3. The cow should be made clean by washing and regular brushing, so that no manure adheres to the hair to be shaken or brushed off into the milk.

4. The utensils used in handling the milk, and especially the milk-pails, should be thoroughly sterilized by careful washing with boiling water.

By using effective caution in these four particulars the contamination of the milk may be greatly lessened. As precautions in these directions are imperfectly carried out, the number of bacteria increases and the conditions are more favorable for early deterioration of the milk.

Practically, most milk which is furnished to the consumer contains an abundance of bacteria, and an important practical problem is how their injurious effects may be avoided. It has been found that the growth of bacteria is prevented by a low temperature. Therefore, it is apparent that all milk should be cooled to a temperature not above 50 F. as soon after it is drawn from the cow as possible, and it should be kept at a temperature not above 50 F. until it is used.

Through appointment of milk commissioners it is now possible to secure certified milk from certified cows. The number of bacteria and their virulence have been checked and such milk if fresh may be assumed to be safe.

STERILIZATION AND PASTEURIZATION

Not so very many years ago the advice was given to obviate infected milk by "sterilizing" it by boiling. It was even advised to sterilize all the milk which was fed to infants. This was soon found to be objectionable (1) because it altered the taste and made the milk less palatable, and (2) because exposure to such a degree of temperature as was necessary to boil milk produced such changes in it, including a destruction of the enzymes, that it was not a good food for infants.

Next in order to avoid this interference with the digestibility of the milk, it was proposed to subject the milk to such a temperature, below the boiling-point, as would inhibit the growth of bacteria and would not make other objectionable changes in it. This temperature was found to be about 140 F., and the process of heating the milk to this temperature was designated as "pasteurization." In recent years pasteurization has been extensively employed, especially in large cities, and unquestionably with a favorable influence on infant mortality.

Two methods are in use, a "holding" and a "flash" method. In the latter the milk is brought to a high

temperature and allowed to cool; in the former, it is held from fifteen to thirty minutes at a temperature which kills all organisms and spores. There seems to be little doubt that the "holding" method is preferable.

Infants that are fed on a strict milk diet, and that pasteurized, seem susceptible to such diseases of altered metabolism as scurvy, rickets and purpura. The addition of orange juice to the diet will be of aid in obviating such disturbances.

INFANTILE CONVULSIONS

Convulsions in infants are not a disease entity, but the demand for prompt treatment in every case has caused them to be considered as a group rather than in direct relation to the underlying cause. Needless to state, the condition usually means a hyperexcitability of the nervous system. This may be related to heredity, the parents being neurasthenic or neurotic; to lowered vitality; to errors in nutrition, most frequent in those artificially fed; to chronic diseases such as rickets, syphilis, tuberculosis; or to some derangement of the glands of internal secretion. These rather general causes may be further exaggerated by the presence of such exciting conditions as acute pain due to local infection; continued irritation, due to elongated or impervious prepuce; to this type also may be referred those cases undergoing dentition. Because of the incoordination of the nervous system infants seem especially predisposed to convulsions, but the fact that the convulsion may be a manifestation of any acute infectious disorder, perhaps involving the nervous system should not be overlooked. It is possible also that the convulsions may be the first indication that the child is epileptic.

As to the relation of nutrition to convulsions, Grulee (*Amer. Jour. Dis. Child.*, 1913, March, p. 205) has been able to show that some irritating substance present in the whey of cows' milk may produce convulsions, which disappear when the whey is eliminated from the diet.

There exists also a nervous reaction in infants which has been characterized as the "spasmophilic diathesis." It is marked by heightened irritability as measured by

electric reaction and by definite signs, (Chvostek-tapping the cheek causes twitching of the corner of the mouth) of increased nervous irritability. The movements here, rather than being only convulsive, may show the tremors known as tetany.

TREATMENT

It is important that the convulsions be stopped early. Sometimes the mere placing of the child in a warm bath is sedative. At the same time cold may be applied to the head. If the convulsions are severe they may be arrested immediately by the use of chloroform. But a very little is required to quiet the little patient and it should be administered with caution. Rectal injections of chloral are much used in a dosage of 3 to 8 grains. After the convulsions have ceased bromids may be given over several days to act as a sedative to the nervous system. A good cathartic (castor oil) should be given and perhaps an enema. Steps should be taken to ascertain the cause of the condition, and if possible to correct it. If an elongated prepuce is noted circumcision may be necessary.

If a child shows signs of tetany, and certainly if it shows rickets, calcium is indicated, as well as food that contains calcium. Calcium may be given as limewater, as calcium lactate or as calcium glycerophosphate. Calcium lactate 0.05 gm. (about 1 grain) may be given three or four times in twenty-four hours; or 0.10 gm. (about 2 grains) of calcium glycerophosphate may be given in the same frequency. Calcium lactate should be dissolved, calcium glycerophosphate should be given as powder, and either may be administered in milk.

If any one of the many reflex causes of convulsions has been diagnosed, the treatment that must be instituted is self-evident.

If it is decided that the trouble is a beginning epilepsy, the treatment should be directed toward removing any possible evident cause. If no tangible cause can be discovered, bromids should be given more or less continuously to prevent, if possible, the epileptic habit.

INCONTINENCE OF URINE IN CHILDREN

This troublesome condition occurs mostly at night, and occurs in both boys and girls. More or less involuntary evacuation of the bladder at night is not considered abnormal in a babe or a young child, but when a child is over 3 years of age it must be considered more or less pathologic. Among the most frequent causes are worms, elongated or adherent prepuce or adherent clitoris, and the general restlessness and poor sleep caused by adenoid tissue in the pharynx interfering with breathing; less frequent causes are bladder irritation caused by an actual inflammation in the bladder, or by calculi. Of course simple or specific urethritis, vaginitis or any foreign matter in the vagina, diabetes mellitus, and diabetes insipidus may be causes. If none of these is present, it must be assumed that there is a congenital weakness of the sphincter muscle of the bladder, or that the urine is irritable and that there is a congenital hypersensitiveness of the bladder, so that the least distention causes its contraction. The normal desire to urinate probably comes as a rule from the posterior portion of the urethra slightly dilating and allowing urine to trickle into it. If this relaxation of the sphincter occurs abnormally, of course the reflex desire to urinate is abnormally frequent.

If any of the foregoing reflex causes of nocturnal enuresis are present, proper treatment will stop the wetting of the bed. If none are present, recourse must be had to various treatments. Perhaps more valuable than medicinal treatment is a rearrangement of the general management of the child. The loosening of an adherent prepuce or an adherent clitoris may alone immediately cure the patient of wetting the bed.

The diet is important in the general management of such a child, and as soon as it is of such an age that milk is not necessary for its food it is better to restrict the amount of milk, as nearly two-thirds of milk must be passed out by the urine. Of course coffee and tea should be eliminated from the diet of all children, especially of children suffering from this condition. The nearer the diet is vegetarian and

cereal, the better for the patient, as vegetables keep more water in the intestines and pass more water out by the bowels and less by the urine than does a diet of more or less meat. All fluids should be restricted after 3 or 4 p. m. and the child should be awakened to urinate when the parents go to bed. Preventing the child from lying on its back and raising the foot of the bed are old methods which are pretty generally known. The object is to prevent, if possible, the urine trickling into the back part of the urethra and starting the vesical spasm.

While the child may be treated psychically, or mentally impressed with different physical treatments, and perhaps in some way frightened into keeping up a nocturnal memory picture of the necessity of waking when the desire to urinate occurs, still, the patient should never be punished, as this is rarely of any value.

Various electrical treatments have been tried, and probably none any more successfully than the faradic with an indifferent electrode over the spine and an active small electrode applied over the bladder, over the pubis and over the perineum, and the current made sufficiently strong to cause more or less contraction of the tissues. Theoretically this application of electricity may cause contraction and stimulation of the sphincter of the bladder, but most likely the greatest amount of good is done by the psychic effect on the child. Sometimes the galvanic or constant current, with the large electrode on the spine being the anode and the more active smaller electrode being the cathode and the current allowed to make and break, is successful.

Often the passing of sounds has seemed to be the cause of improvement. In other cases a cold perineal douche, or cold-water spongings applied to the perineum apparently cures the condition.

Medication has not been very satisfactory. Probably the most successful drug is atropin, either in the form of belladonna or atropin sulphate, and the amount given should be sufficient to cause some physiologic action. The dose to begin with would be 1/500

grain of atropin sulphate to a child 5 years old, administered at bedtime. This dose should be increased until some physiologic activity is evident. Frequently ergot is a successful medication, especially when there is a tendency to polyuria or diabetes insipidus. The ability of ergot to stimulate smooth muscle fiber is well understood, and that it is more or less of a sedative to the central nervous system is believed by many clinicians. The ergot is best administered as a thoroughly active fluidextract in doses of 10, 15, 20 or more drops, depending on the age of the child, and given directly after the evening meal.

Though almost any treatment may at times be rapidly successful, it must not be forgotten that many of these cases of nocturnal enuresis end abruptly without any special treatment, and the most inveterate cases frequently have the trouble cease at puberty, owing probably to a better development of all the muscular tissues of the genito-urinary tract.

PHYSICAL THERAPY

THE LOCAL APPLICATION OF DRY HOT AIR

The general practitioner will usually not be able to apply the major elements of physiologic therapy to any great extent because of the elaborateness of the plant required, but some of the minor elements can be perfectly utilized by the general practitioner, and most gratifying therapeutic results obtained. The local application of dry hot air is one of the most useful of them.

There are on the market several forms of apparatus for its application, all of which will do good work. In order to be efficient an apparatus must be capable of producing 400 degrees Fahrenheit in fifteen minutes at the outside, and of maintaining this temperature indefinitely. In order to be useful to the general practitioner these machines must also be easily portable. They may be heated by gas, gasoline, alcohol, or electricity, but one that is to be used in general practice should be supplied with a gasoline attachment, whatever other heating agent is usually employed, as the gas-pressure in some houses is not sufficient to produce an adequate degree of heat, electricity is available in only a few houses, and alcohol is not generally satisfactory for several reasons.

Preparation of the patient for the application is simple, consisting merely in covering the part of the body to be treated with three thicknesses of loose-meshed Turkish toweling, so as to secure intimate contact between wrapping and skin. If the perspiration which is induced as soon as the heat strikes the skin, is allowed to remain on the skin during treatment, it will soon boil under the influence of the intense heat and blister the patient. These wrappings absorb it as soon as it is formed, the heat immediately vaporizes it and it rapidly diffuses itself out of the wrapping.

Directions for the general operation of the machines, are furnished by the manufacturers. Complete treat-

tises on thermaerotherapy can be obtained by those who take more than a passing interest in it.

The physiologic effect of the dry hot air application is produced in two ways: first, by thermic irritation of the numerous nerve-endings in the skin, and second, by the actual raising of the temperature of those portions of the body in immediate contact with the heat.

Irritation of the nerve-endings of the skin results, by reflex action, in (1) marked dilatation of the capillary areas, hence greatly increased blood-supply; (2) enormously increased functionation of the sweat-glands, hence increased local elimination, and (3) acceleration of the cell nutrition and function through reflex stimulation of the spinal centers. The raising of the temperature, *en masse*, results in acceleration of the chemical reactions constituting the cell metabolism of the part. It will be observed that the combination of these influences result in increased physiologic resistance of the tissues affected and acceleration of the process of repair of damaged tissue elements.

The sphere of action of this application, then, is in the treatment of pathologic conditions which are strictly local in character, and which can be happily influenced by increasing the local physiologic cell resistance and the local nutritional, absorptive, and eliminative functions. Such conditions obtain in many diseases encountered by the general practitioner but it will suffice to mention three which illustrate the different types of cases in which the local dry hot air application is most useful. These three are (1) sprains, (2) most cases of true rheumatism in which but one or two joints are involved, and (3) local septic infection of the extremities before the process has involved the lymphatics connecting the affected part with the trunk, and in which the general toxemia resulting from the local lesion is not profound enough to overwhelm the organism as a whole.

SPRAINS

In an uncomplicated sprain the lesion consists simply of a traumatic solution of the continuity of soft tissues about the affected joint, accompanied by severe pain probably due to congestive irritation of lacerated nerve fibers. The therapeutic indications are (1) to

relieve pain, (2) so to influence the trophic functions as to secure the quickest possible repair, and (3) to promote absorption of the exudate.

Increase in the physiologic resistance of cells is not called for in this condition, but acceleration of the nutritional, absorptive and eliminative processes are indicated; practically clinical experience demonstrates that the local dry hot air treatment is well qualified to satisfy the requirements. If a sprain is put under treatment by this agent within three or four hours after the injury has been sustained, the pain will be relieved within half an hour, and all traces of the trouble will usually have disappeared within forty-eight hours. If the case is three or four days old, however, and exudate is present to any great extent, complete removal of disability may require from two to three weeks; but the pain is usually susceptible of the same immediate relief as in early cases.

The local dry hot air application also serves as a valuable diagnostic test in these cases, by informing us as to whether or not a fracture coexists. When a fracture complicates the case the treatment will usually relieve the pain somewhat; less frequently it will not relieve it at all, and sometimes it makes it worse. Its power to effect practically complete relief of pain is so universally observed when the lesion is uncomplicated, that failure to produce such relief is almost positive evidence that a fracture is present.

RHEUMATISM

In this affection we have an acute, infectious, inflammatory process, probably specific in nature, characterized by intense pain and more or less effusion, both probably due to local toxin irritation. The therapeutic indications, then, are to increase the physiologic resistance of the invaded regions and to accelerate elimination from this region. A sufficient increase in the physiologic resistance of the threatened cells would stop the invasion and immediately decrease the number of the invading organisms, which would immediately lessen the virulence of the toxemia attributable to them; accelerating elimination would still further lessen toxemia; and dilating the capillary areas would

relieve blood-vessel spasm and whatever stasis of blood-vessel contents might be dependent thereon.

Clinically, dry hot air demonstrates its capacity for producing all these effects and some cases of rheumatism can be cured by it alone. The proportion of such cases, however, is not large enough to justify confining our therapeutics entirely to this agent, and salicylic acid, in some form and in adequate dosage, should always accompany the dry hot air treatment. When these two remedies are used in combination, however, there result (1) immediate relief from pain, however severe, (2) a shortening of the duration of the disease to from five to ten days, (3) a lessening of the likelihood of cardiac involvement because the rapidity with which control over the condition is obtained diminishes the time period during which the infection threatens structures other than those originally affected. When this picture is compared with that resulting from ordinary antirheumatic therapeutics, the beneficent rôle which dry hot air plays in the management of this disease becomes at once apparent.

This happy picture, however, applies only to uncomplicated cases in which but one or two joints are involved, cases in which the general toxemia is not severe enough to depress the general nervous system seriously. When the general toxemia is very severe, the development of a satisfactory recovery will necessitate invoking the powerful influence on general metabolism and elimination of the general or body application. The local application will be just as effective in relieving pain but the relief will not last as long and it will not be as complete. Neither does this picture apply to cases of arthritis deformans, neuritis, inflammatory joint or bone lesions, or malignant disease, which are so often misdiagnosed as rheumatism.

LOCAL SEPTIC INFECTION

This is another condition in which the physiologic influences of local thermaerotherapy are most appropriate. The disease process is of distinctly local origin, it involves a lowered vitality, or lack of physiologic resistance on the part of the involved tissues, and in

the majority of cases it occurs on one of the extremities at a considerable distance from the trunk.

The therapeutic indications are (1) to increase the physiologic resistance of the invaded structures, whereby the pabulum of the micro-organisms is so modified as to inhibit their development, lessen the virulence of their toxic emanations, and finally to accomplish their destruction; and (2) to eliminate as rapidly as possible the toxic products already present in the affected parts.

A comparison of the physiologic action of this therapeutic agent with the pathology and therapeutic indications present in this ailment, explains at a glance why dry hot air would be expected to inhibit harmful attributes, and the clinical findings again bear out most happily the theoretical deductions. If a case is put under treatment before suppuration has been established and before the infective process has invaded that portion of the limb (lymphatics or other structures) immediately contiguous to the trunk, the pathologic phenomena will usually be abruptly arrested and the inauguration of convalescence will coincide with the first treatment. If suppuration at the point of infection has been established, the destructive process will become sharply and quickly localized when, by a stroke of the knife, the pus can be evacuated and the case brought to a rapid and satisfactory termination. If, however, the lymphatics at the junction of the affected part with the trunk are involved or if general toxemia is severe enough to seriously depress the central nervous system, the local application will have to be either superseded or accompanied by the general or body treatment.

Among other conditions in which the local application of hot air is more or less useful are pneumonia, pleurisy, acute gout, synovitis, fibrous ankylosis, some cases of neuritis, varicose ulcers, and sluggish healing processes not due to malignant, tuberculous or syphilitic infection. The physiologic action of hot air is definite and constant and hence constitutes a reliable guide as to what sort of pathology will yield to its influence.

HYDROTHERAPY

The rôle of baths and hot and cold applications in the treatment of disease has frequently been mentioned in the preceding articles.

Recently Jackson (*Jour. A. M. A.*, 1915, May 15, p. 1050) has discussed the use of hydrotherapy in the treatment of mental diseases.

MENTAL DISEASES

"The forms of hydrotherapy available," he says, "are ordinary sponging (cold or tepid), hot packs, cold packs, enteroclysis, hypodermoclysis and the free use of water internally. Hot packs and cold packs are especially advantageous in those conditions in which the tubs, cabinets and sprays are contraindicated. They are exceedingly useful in the extramural treatment of the insane, and possess unusual advantages in the intramural treatment of the various psychoses. The free use of water by mouth is indicated in all forms of insanity. Enteroclyses as well as hypodermoclyses are especially advantageous in the treatment of all cases showing exhaustion, excitement or depression. Swimming pools are useful for exercise and diversion."

Hydrotherapy is employed in excitement, depression, for elimination, toxemias, when relaxation, mental diversion or exercise is desired.

WATER BY MOUTH

Water by mouth should be urged in definite quantities fixed by the physician. It is an excellent diuretic. When urging water, under various conditions, the amount of urine passed in twenty-four hours and the specific gravity of the twenty-four hours' output should be known, as well as the less frequently omitted examination for albumin and sugar. If the urine were more frequently examined during simple acute processes the profession would be surprised at the frequency with which disturbances of the kidney functions are found. All too frequently, when an insufficient amount of urine is passed, more or less irritant diuretics are given when simply an increased amount of water is needed.

A caution should be noted here, that with real nephritis, or with an insufficiency of the heart, or a failure of the circulation, or when there is edema, large amounts of water should not be drunk. On the other hand, in conditions in which water should be administered both as a diuretic and to dilute all the excretions, it is not sufficient for the physician to direct a patient to "drink plenty of water," but he should specify the amount of water he wishes taken during the twenty-four hours.

Especially is it necessary, during acute infective processes in children, to urge their drinking plenty of water, perhaps as lemonade, orangeade, or barley water; but water in some form should be freely given.

CABINET BATHS

Cabinet baths are used in various toxemias to encourage elimination through the skin. Where there is marked physical deterioration, advanced circulatory or cardiorenal disease, they should be given with caution.

This treatment should be given by trained attendants who can interpret physical symptoms. Medical stimulants should be close at hand, an ice cap applied to the head, and water given freely during the time of sweating. Perspiration usually becomes profuse at the expiration of about ten minutes, and the patients should pass immediately into the shower for subsequent sprays in order to avoid catching cold. Cabinets should be well protected, all heat pipes or frame work properly protected, and doors to the cabinets should be such that they can be opened quickly. The neck should be well covered, and a large towel should enclose the patient's lower body in order that the procedure may be done as modestly as possible.

CONTINUOUS BATHS

The continuous bath is usually a warm bath, which does not drop below 88 or exceed 100 F. It can be used in cases of depression as well as marked excitement. Aside from the therapeutic effect it seems to have a moral influence over certain incorrigible patients. Incorrigibility itself is not an indication.

The bath may be administered in several forms; tubs may have separate regulators, but preferably, one central stand should be the control. Patients may be given the freedom of the bath or they may be restrained, depending on the nature of the case as well as the therapeutic result desired. A bath of short duration at frequent intervals has more advantages than a prolonged bath of days or weeks.

The contraindications are, first, the tub baths should not be prescribed for cases with marked physical deterioration, wasting or advanced physical diseases or skin diseases; second, cabinet sweats are contraindicated in cases in which there is marked excitement as well as marked physical disease.

HYDROTHERAPY IN UROLOGY

Martin (*Jour. A. M. A.*, Jan. 9, 1915, p. 102) has discussed various hydrotherapeutic measures of value in urology.

Frequent applications of short fomentations, either hot or cold, cold compresses, or hot or cold immersions, he finds constitute a valuable adjunct to any treatment in combating infections. Cases of acute specific urethritis experience relief and more speedy cure by immersing the organ in alternate hot and cold water several times a day, as an adjunct to regular treatment.

THE SITZ BATH

A frequently prescribed hydiatic measure by urologists is the sitz. The proper technic should be followed and it has a marked analgesic effect. Patients, when taking their own treatment, find the relief so gratifying that they may remain in it too long, result in an atonic reaction that is more or less debilitating. When used for its analgesic properties for calculus colic, this relaxed effect is desirable, but not so in combating chronic congestions or infections. "The best effect is obtained from a short hot sitz, from 115 to 120 F., for five to eight minutes, followed by a short cold dip or effusion, the reaction of which prolongs the primary tonic effect of the heat, by producing a tonic dilatation of the peripheral vessels, and a more active circulation. A hot sitz should always be fol-

lowed by a cold sitz when treating chronic infections." In private homes, Martin suggests the effect can be obtained in a measure by gradually cooling the water or dashing cold on the parts from a bucket. In cases of chronic infections, the advantage of such a bath is augmented by preceding it with alternate hot and cold sprays and ascending perineal douches.

Martin emphasizes the value of the prolonged cold sitz. He noted that gynecologists use it effectively in the palliative treatment of uterine fibroid, with chronic congestion accompanied by menorrhagia. "They have demonstrated," he says, "by experience that the reaction following cold sitz baths increases the circulation in the uterus, which aggravates the menorrhagia, but prolonged (from twenty to thirty minutes at 60 to 70 F.), produces continued contraction of the pelvic and abdominal viscera, with a relief of congestion following. The prolonged active stimulation of the vasomotors exhausts them, thus losing their power to react, so that the primary effect of the cold is continued after the bath. Much of the benefit derived by the patient from this measure is due to the contraction and tone to relaxed intestinal viscera, which noticeably increases their activity and thus stimulates nutrition and intestinal elimination." This measure has proved valuable in the palliative treatment of prostatic hypertrophies with congestion, malignant growths with hemorrhages, atonic dilated bladders (especially following prostatectomies) and in sexual debility.

Care should be exercised at the start. Weak and debilitated patients should not be given the prolonged cold bath until their ability to react is established. This is accomplished by gradually reducing the temperature and extending the time from day to day. Reaction can be facilitated by a simultaneous hot foot bath, and especially by vigorous friction to parts immersed. Chilling is prevented by protection of the shoulders with flannel. The cold sitz should be preceded by a hot rectal irrigation, and followed by a spray. It is positively contraindicated in all cases of vesical tenesmus.

The neutral sitz, taken with water at 92 to 95 F. for from fifteen to thirty minutes, Martin finds valu-

able, because of its soothing and sedative effect in all irritable conditions, accompanied by priapisms and erotomania.

Another useful measure which can be utilized by patients at home, is the heating pelvic pack. A piece of linen, flannel and mackintosh, shaped and applied like an infant's napkin, is used as a heating compress to any other part by wringing the linen out of ice water and applying next to the skin, covered by flannel and mackintosh. Its action produces dilatation of superficial vessels, with relief of internal congestions. It possesses a decided value in the relief of pain and for activating the circulation in cases of cystitis, prostatitis, epididymitis, and similar complaints. It is a valuable after-treatment following a sitz or hot fomentation, and is best employed at night.

General measures, such as packs and electric light baths, and tonic measures, as hot and cold applications to the spine, salt glows and general hot and cold sprays, are valuable in stimulating general vital tone. With their proper use, weak anemic and debilitated patients, who may be suffering from some condition demanding radical treatment, and unable to stand it, may often be built up.

Combinations of these applications, graduated as the patient's ability to react indicates, are effective in many cases of acute and chronic infections.

The routine use of the hip and leg pack followed by cold-mitten friction after surgical procedures is sometimes a valuable measure to abort shock and pulmonary congestions. These are conveniently given by the use of the electric thermaphore pack, which is placed on the bed and the current turned on before the patient returns from the operating room. The patient is thus put at once in a warm pack, which is folded around the legs and hips and heated by the electric current for ten or twelve minutes. A cold-mitten rub completes the treatment.

GRUELS AND STARCHY DRINKS

The food value of a starchy drink during certain illnesses is considerable; also, many thin, cereal liquids are very soothing to patients with gastrointestinal dis-

turbances. With seriously ill patients a happy arrangement of a mixed diet of some milk, some beef juice, and some thin, digestible, well-cooked starch makes the most appropriate food.

The following suggestions of the way such nutritious drinks should be prepared are from "Practical Dietetics," by Alida F. Pattee. For convenience an approximate estimate of the calorific value has been added to each receipt.

FLOUR GRUEL

| | |
|---------------|-----------------|
| Milk | 1 cup |
| Flour | ½ tablespoonful |
| Salt..... | 1 speck |
| Raisins | 1 dozen |

"Scald the milk, mix the flour with a little cold milk and stir into the scalding milk. Cook in a double boiler for one-half hour or on back of stove in saucepan. Stone and quarter the raisins, then add water enough to cover; cook slowly until the water has all boiled away; add to gruel just before serving, or eat with the raisins as desired. If there is much diarrhea the raisins should be left out."

Calorific value approximately 150 cal.

BARLEY GRUEL

| | |
|--------------------|------------------|
| Barley flour..... | 2 tablespoonfuls |
| Milk, scalded..... | 1 quart |
| Salt. | |

"Blend the barley flour with a little cold milk and stir into the scalding milk. Cook in a double boiler two hours, salt to taste, and add sugar if desired; strain."

Calorific value approximately 650 cal.

BARLEY GRUEL WITH BROTH

| | |
|-------------------|------------------|
| Beef broth..... | 2 cups |
| Barley flour..... | 2 tablespoonfuls |
| Cold water..... | 2 tablespoonfuls |
| Salt | 1 saltspoonful |

"Mix barley flour and salt with the cold water to form a smooth paste. Add gradually to the boiling

stock and boil one-half hour. Strain and serve very hot."

EGG AND SHERRY GRUEL

| | |
|-----------------------|-----------------|
| Egg | 1 |
| Sherry | 1 wineglassful |
| Lemon juice..... | 1 teaspoonful |
| Sugar | 1 tablespoonful |
| Grated nutmeg. | |
| Smooth hot gruel..... | 1 cup |

"Beat the egg, add wine, lemon juice and nutmeg, and pour on the hot gruel."

Calorific value approximately 250 cal.

ARROWROOT GRUEL

| | |
|---|------------------|
| Arrowroot | 2 teaspoonfuls |
| Cold water..... | 2 tablespoonfuls |
| Boiling water or milk..... | 1 cup |
| Sugar, lemon juice, wine or brandy as required. | |

"Blend the arrowroot and cold water to a smooth paste, add boiling water or milk and cook in a double boiler for two hours. Add salt, strain, and serve hot."

Both the barley and arrowroot may be administered in diarrhea.

Calorific value approximately 150 cal.

INDIAN MEAL GRUEL

| | |
|--------------------|-----------------------------|
| Indian meal..... | 1 tablespoonful |
| Flour | $\frac{1}{2}$ tablespoonful |
| Salt | $\frac{1}{4}$ teaspoonful |
| Cold water..... | 2 tablespoonfuls |
| Boiling water..... | $1\frac{1}{2}$ cups |
| Milk or cream. | |

"Blend the meal, flour and salt with the cold water to make a smooth paste and stir into the boiling water. Boil on back of stove one and one-half hours, dilute with milk or cream, strain."

Calorific value approximately 250 cal.

RICE GRUEL

| | |
|--------------------|------------------|
| Rice flour..... | 1 tablespoonful |
| Cold water..... | 2 tablespoonfuls |
| Boiling water..... | 1 quart |
| Salt. | |

"Mix the rice flour with a little cold water to form a smooth paste, add the boiling water, and cook in a

double boiler until transparent and thoroughly cooked. Add salt to taste, sweeten, and add milk if desired; strain."

Calorific value approximately 40 cal.

OATMEAL GRUEL

Coarse meal..... $\frac{1}{4}$ cup
Salt $\frac{1}{2}$ teaspoonful
Boiling water..... $1\frac{1}{2}$ cups
Milk or cream.

"Add oatmeal and salt to the boiling water, cook four or five hours in a double boiler, adding more water if necessary. Strain, and dilute with hot milk to make it of the right consistency. Re-heat and serve. Sugar and a little port wine may be added if desired."

Calorific value approximately 150 cal. a cup.

FARINA GRUEL

Farina1 tablespoonful
Cold water.....1 tablespoonful
Boiling water.....1 cup
Scalded milk.....1 cup
Salt.

"Mix the farina with the cold water, add to the boiling water and boil thirty minutes. Add the scalding milk, taste and season properly. A little sugar may be added if desired, or an egg may be beaten and the gruel added to it."

Calorific value approximately 150 cal.

BROWNE FLOUR GRUEL

"Tie one-fourth pound of wheat flour into a thick cloth and boil it in a quart of water for three hours. Remove the cloth and expose the flour to the air, or heat it until it is hard. Grate from it when wanted a tablespoonful, put into half a pint of new milk, and stir over the fire until it comes to a boil, add a pinch of salt and a tablespoonful of cold water, and serve. This gruel is excellent for children with simple diarrhea."

BARLEY WATER

Pearl barley..... $1\frac{1}{2}$ tablespoonfuls
Cold water.....1 quart
Saltenough

"Wash the barley, add cold water, and let it soak several hours; drain and add the fresh cold water, boiling gently over direct heat for two hours, down to one pint, adding water from time to time; salt to taste, and strain through muslin. Cream or milk may be added, or lemon juice and sugar." This makes a demulcent drink, slightly constipating.

RICE WATER

| | |
|--------------------------------|------------------|
| Rice..... | 2 tablespoonfuls |
| Cold water..... | 1 pint |
| Boiling water or hot milk..... | enough |
| Salt | enough |

"The carefully washed and cleaned rice should be added to the cold water and cooked an hour, or until the rice is tender. Strain, and dilute with the boiling water or hot milk to the desired consistency, and season with salt." Sugar or cinnamon may be added if desired or advisable.

OATMEAL WATER

| | |
|--------------------|-----------------|
| Oatmeal | 1 tablespoonful |
| Cold water..... | 1 tablespoonful |
| Salt | a little |
| Boiling water..... | 1 quart |

"Mix the oatmeal and cold water, add the salt, and stir into the boiling water. Boil three hours, adding water as it boils away. Strain through a fine sieve or cheesecloth, season, and serve cold."

TOAST WATER

| | |
|---------------------------|--------|
| Stale bread, toasted..... | 1 cup |
| Boiling water..... | 1 cup |
| Salt | enough |

"Dry in an oven until crisp and brown, thin, inch squares of the bread. Take a cupful of this toast broken into crumbs, add water, and let it stand one hour. Strain through cheesecloth, season, and serve hot or cold." If advisable, milk or cream and sugar may be added.

ALBUMINOUS DRINKS

EGG BROTH

| | |
|------------------|-----------------|
| Yolk of egg..... | 1 |
| Sugar..... | 1 tablespoonful |
| Salt..... | 1 speck |
| Hot milk..... | 1 cup |

"After beating the egg, add the sugar and salt, and then pour on the hot milk. If desired this may be flavored with brandy or wine.

Calorific value approximately 230 cal.

EGGNOG

| | |
|------------------|-----------------------------------|
| Egg | 1 |
| Salt..... | 1 speck |
| Sugar..... | 1 tablespoonful |
| Milk..... | $\frac{3}{4}$ cup |
| Sherry wine..... | $1\frac{1}{2}$ tablespoonfuls, or |
| Brandy..... | 1 tablespoonful or less |

"The beaten egg, with the added sugar and salt, should be chilled and the milk chilled before the whole is mixed with the liquor. A little nutmeg may be added if desired."

Calorific value approximately 220 cal.

JUNKET EGGNOG

| | |
|-----------------------------|-----------------|
| Egg | 1 |
| Milk..... | 1 cup |
| Sugar..... | 1 tablespoonful |
| Rum, brandy or wine..... | 2 teaspoonfuls |
| Hansen's junket tablet..... | $\frac{1}{4}$ |

"Beat the white and yolk of the egg separately very light, then blend the two and add the sugar dissolved in the rum. Heat the milk lukewarm, stir into the egg mixture and add quickly the tablet which has been dissolved in cold water. Pour into small warm glasses and sprinkle grated nutmeg over the top. Stand in a warm room undisturbed until firm, and then put on ice to cool. This can be retained by the most delicate stomach."

Calorific value approximately 250 cal.

BEEF EGGNOG

| | |
|---------------------|-----------------|
| Egg | 1 |
| Salt..... | 1 speck |
| Sugar..... | 1 tablespoonful |
| Hot beef broth..... | ½ cup |
| Brandy..... | 1 tablespoonful |

“Beat the egg slightly, add the salt and sugar, then gradually add the hot broth, then the brandy, and strain.” The sugar and brandy may be omitted, if preferred.”

Calorific value approximately 150 cal.

EGG AND BRANDY

| | |
|-----------------|------------------|
| Eggs | 3 |
| Cold water..... | 4 tablespoonfuls |
| Nutmeg..... | a little |
| Brandy..... | 4 tablespoonfuls |
| Sugar | enough |

“Beat the eggs, add the cold water and brandy, and sweeten to the taste. Administer a tablespoonful at a time.”

Calorific value approximately 300 cal.

ALBUMINIZED MILK

| | |
|-------------------|-------|
| Milk..... | 1 cup |
| White of egg..... | 1 |
| Salt..... | |
| Flavoring..... | |

“Place the milk and egg in a covered glass fruit jar, shake until thoroughly blended, salt and flavor as desired. Strain and serve immediately.”

Calorific value approximately 150 cal.

ALBUMINIZED WATER

| | |
|---|----------|
| Water (cold water boiled, and then cooled) .. | 1 cup |
| White of egg..... | 1 |
| Lemon juice..... | |
| Sugar..... | to taste |

“Put all the ingredients into a covered glass fruit jar and shake until thoroughly blended, then strain and serve immediately.”

Calorific value approximately 75 cal.

MISCELLANEOUS

ANESTHESIA

ESSENTIALS OF SAFE ANESTHESIA

Before commencing the administration of the anesthetic, the anesthetist should give careful attention (1) to the operating-room; (2) to the emergency table; (3) to the patient.

The *operating-room* must be warm, and the operating-table as comfortable as possible for the patient. There must be plenty of blankets. The legs and arms, a low pillow for the patient's head, and a pillow for the back, should all be arranged to be as comfortable and warm as possible without, of course, interfering with the exigencies of the particular operation. It is advisable to have a strong, well-working faradic battery, an oxygen tank (it should be remembered that Professor Henderson thinks too much oxygen in ether shock is inadvisable, and even advises carbon dioxid gas), transfusion apparatus, and warm, aseptic physiologic saline solution.

The articles on the *emergency table* should comprise:

1. Chloroform.
 2. Ether.
 3. Petrolatum.
 4. Boric acid eye-drops (1 per cent.).
 5. Tongue forceps.
 6. Long forceps for swabbing, and properly made gauze or cotton pledgets (no ravelings), or pieces of sponge.
 7. A mouth-gag, or cork, or a piece of rubber.
 8. A large needle threaded with strong silk.
 9. A pus basin.
 10. Towels.
 11. Two hypodermic syringes.
 12. Atropin sulphate tablets (each 1/200 of a grain).
- (The amount is small, but the dose may be repeated, if needed.)

13. Strychnin sulphate tablets (each $1/40$ of a grain). The amount is small, but the dose may be repeated, if needed.)

14. Ampoules of saturated solution of camphor in sterile olive oil.

15. Ampoules of aseptic ergot.

16. Epinephrin solution in aseptic ampoules, 1:10,000.

The Patient:

1. A twenty-four hours' specimen of urine should, if possible, have been examined; certainly a single specimen should have been examined.

2. The condition of the heart and arteries should have been examined and the best anesthetic selected.

3. The patient should have received no solid food for a number of hours before the operation. If the operation is done early in the morning, it is best, three hours before the operation, to give either a cup of hot bouillon or a cup of black coffee.

4. The bowels should have been properly moved, generally by the aid of some cathartic, and often an enema is advisable at least an hour before the operation.

5. The urine should have been passed immediately before the administration of ether is begun.

6. False teeth should be removed. The nose, throat, mouth and teeth should be cleansed with an antiseptic wash. Hairpins should be removed, if the patient is a female, and the hair should be properly bound up under a cap; it is better that this cap is not made air tight as the head is likely to become very moist with perspiration, if the cap is impervious.

7. The face should be anointed with petrolatum as the vapor of ether is irritant to the skin.

8. The rate of the pulse and the feel of the radial and temporal arteries should be noted before the anesthetic is begun.

DUTIES OF THE ANESTHETIST

The anesthetist should be a physician who is especially trained for this work. He should devote his entire attention to the anesthesia, and his attention should not be diverted from his own work to the

operation, or for any other purpose. He should make himself aware of the condition of the heart by holding the index-finger of one hand over the temporal artery where it passes over the zygomatic process in front of the ear. He can be aware of the condition of the respiration either by the rise and fall of the chest or by feeling the exhalation of the air through the mask.

Next to the pulse and respiration, the pupil of the eye is the most important index to the condition of the patient. Sudden dilatation of the pupil, especially if accompanied by hiccough, are grave symptoms, and should indicate the immediate suspension of the anesthesia and the withdrawal of the ether.

In order to determine when anesthesia is complete many separate the eyelids and touch the conjunctiva with the tip of the finger. This is a dangerous practice and should not be followed, as the eye may be injured or infected.

A most useful test for determining complete anesthesia is raising the arm. If this falls without any muscular contraction, the anesthesia is complete. This condition may be present shortly after the administration of the ether is commenced, the so-called primary anesthesia, which may be followed by a brief return of muscular activity. The continued administration of the ether will soon produce complete anesthesia. If the operation is an abdominal one, a little ether poured on the abdomen will soon show, by reflex action from the cold, whether the patient is thoroughly anesthetized or not. Also, manipulations of any kind at the region to be operated on will often awaken an incompletely anesthetized patient when other signs have apparently pointed to complete anesthesia.

The patient should be kept as lightly under the influence of the anesthetic as is possible. Very deep anesthesia should be avoided. The anesthesia should be as brief as possible, but this, of course, rests with the operator. As soon as an operation is completed, the ether should be withdrawn. Often this can be done before the final stitches are inserted and the dressing applied. If the patient has not been too deeply anesthetized, he should begin to regain consciousness shortly after the withdrawal of the ether.

NAUSEA AND VOMITING

One of the most troublesome of the sequelae of the administration of ether is nausea and vomiting. The exact cause of this has not been determined definitely. Some have believed that it was due to the irritation of the mucous membrane of the stomach from the ether swallowed, but this is probably not so, at least in all cases. Various methods have been proposed to combat this disagreeable symptom. All are more or less successful. If morphin has been administered before the operation, nausea does not occur as soon as when it has not been administered. It is often advisable to give an injection of morphin and atropin directly after the patient comes out of the anesthesia, that he may not suffer pain and shock from such pain. Such an injection prevents the nausea, at least for a number of hours. Hot water, administered frequently in teaspoonful doses, is often a successful, simple treatment. If mucus and gas are eructated, or actually vomited, large draughts of hot water should be taken, that the stomach may be thoroughly washed out by vomiting, or by the liquid passing the irritant onward into the bowel. Some surgeons believe in washing out the stomach. This is not often advisable, but is indicated if bile is regurgitated, or if blood is extravasated into the stomach. Oxygen inhalations have been suggested. Pure olive oil, in ounce doses, has also been found useful in this condition. Of course, the oil would soothe the stomach, and would be especially sedative, if there was an increased amount of hydrochloric acid present in the stomach.

BLADDER AND KIDNEYS

A not infrequent sequence of the administration of ether is an irritable bladder and more or less local congestion. This is shown by a slight albuminuria and by a diminished amount of urine. Such an irritation may be caused not only by the ether itself, but also by the profuse sweating and the small amount of fluid which has been ingested, causing the urine to become very concentrated and therefore irritant. To avoid such irritation, it is often good treatment, before operation, to inject a pint of hot water, with or with-

out salt (a physiologic saline solution), into the bladder. Such liquid is rapidly absorbed and dilutes the urine and all the secretions and increases the excretion of urine. Such frequent irritation of the kidneys makes it inadvisable, unless there is positive necessity to administer ether a second time to the same person within so short a period as a week. In fact, it has been shown that serious kidney congestion can occur following an ether or chloroform narcosis several weeks subsequent to the anesthesia. The fact that this tendency to irritate the kidneys makes ether an anesthetic generally contraindicated when there is kidney disturbance, especially if there is any acute inflammation present.

To hasten the elimination of ether from the system, plenty of fresh air should be allowed in the room, provided it is sufficiently warm. The patient, under any circumstances, must be surrounded with hot-water bottles and blankets so that he may not lose too much heat, or better, may even acquire heat, during the shocked condition subsequent to anesthesia, such a condition being generally present. Such care that the patient does not lose heat is an important preventive of surgical shock.

SALINES

If much blood has been lost and the patient is in a condition of collapse, besides administering physiologic saline solution by the rectum, intravenous or subcutaneous transfusions of saline solutions are often advisable. Raising the foot of the bed should also not be forgotten in this condition. It may be here parenthetically stated that when the Trendelenburg position has been long used in an operation the return of the patient to a level should be brought about gradually, lest anemia of the brain be caused.

When a patient has lost a large amount of blood, or there is a condition of shock already present, or it is feared that the patient is not going to stand the operation well and yet the operation must be done, the blood from one or both legs should be shut off by tourniquets. When the circulation entirely ceases in the extremity so treated, the blood there contained is, of course, free from the anesthetic, and may be turned in to the gen-

eral circulation at such time as the anesthetist or the operator decides. The patient will of course be revived by such blood. Perhaps the extremity and its blood should not be shut off from the general circulation more than half an hour lest some trophic or nerve changes occur. Danger from clotting and therefore from emboli might well be considered, if there are diseased arteries. High blood-pressure and cerebral congestions may contraindicate this procedure.

LUNG COMPLICATIONS

Another untoward effect is sometimes observed in the supervention of an attack of pneumonia. It has been proved that either ether, chloroform, or alcohol diminish the resistance of the cells to bacteria. Pneumonia is more apt to supervene when the narcosis has been deep and protracted. Many believe that it is also encouraged by the inhalation of cold air with the ether, and it also undoubtedly happens that the development of pneumonia is promoted by the exposure of the patient, while under the influence of the anesthetic, by allowing the coverings to slip off from his body and limbs, or from allowing him to lie in coverings or clothing saturated with blood or other fluids used during the operation. It is exceedingly important that a patient under an anesthetic should be kept warm and dry. Various devices have been designed for keeping the patient warm by appliances connected with the operating table. These are often useful, but caution should be exercised lest the patient, while unconscious, should be burned by such appliances.

As just stated, pulmonary congestion and post-operative pneumonia are frequent serious occurrences after prolonged anesthesia, especially after prolonged etherization. Various factors have been assigned an influence in the etiology of these pulmonary conditions. Among others, it has been alleged that probably the chilling of the respiratory organs by the evaporation of the anesthetic has an important part. It has been observed that anesthetics seemed to act better in warm climates and in warm weather. From these observations it has been deduced that if the anesthetic is

warmed before it is administered, there will be less danger of pulmonary sequelae. During the last ten or fifteen years many anesthetists have insisted on having the anesthetic itself, or the vapor, warmed before it is inhaled by the patient. This may be accomplished in various ways. For ordinary use, the warming of the can of ether or the bottle of chloroform to about the temperature of the body would seem to be most desirable. The inhalation of an anesthetic at this temperature results in less irritation in the throat at the beginning of anesthesia, the early accession of complete anesthesia, the necessity for a smaller amount of the anesthetic during the operation, and hence fewer after effects.

Many patients complain of backache after an operation. This is probably due in many cases to straining of the muscles of the back on account of the back not being properly supported while the patient is unconscious. In order to avoid this a small pillow should always be placed under the lumbar region of the patient while he is on the operating table.

The question frequently arises whether to anesthetize the patient in the operating-room and on the operating table, or in an adjoining room. With reference to this it should be urged that the less a patient is moved about after the administration of the anesthetic is commenced, the better. On the other hand, a nervous patient should generally be anesthetized in an adjoining room, and if possible, on a stretcher or rolling table, so that he may be transferred to the operating-room and then to the operating table with the least possible general disturbance.

CONTRAINDICATIONS OF ETHER

Ether is contraindicated if there is present disease either of the lungs or kidneys. Other contraindications to the use of ether are chronic alcoholism, aneurysm, very high blood-pressure, and an atheromatous condition of the arteries.

DISINFECTION

The control of infectious diseases is inseparably connected with disinfection. The rational use of disinfection began with the growth of our knowledge

of bacteriology. "To disinfect," says Hasseltine (*Pub. Health Reports*, 1915, xxx, p. 2049), "is to free from infectious or contagious matter; to make innocuous. To fumigate is to apply smoke, gas or vapor." He therefore considers as disinfecting measures those which attack the specific cause of disease, as fumigating measures those which by the use of smoke, gas or vapor, attack the specific cause indirectly, through the destruction of intermediate hosts, or carriers other than man, such as mosquitoes, rats, fleas, flies, etc.

USE OF DISINFECTANTS DURING THE COURSE OF DISEASE

If disinfection is properly carried out at the bedside the need of much terminal disinfection is obviated. The secretions and excretions which the patient gives off are the source of infection through the virulent organisms contained in them. Although it is unnecessary to disinfect all discharges in some diseases it is better to err on the safe side and to disinfect all of them.

Sputum, nasal and other discharges should be received on cheap cloths and then incinerated. Solutions containing 5 per cent. phenol, 1 per cent. tricresol, compound cresol solution are also efficient. For feces and urine, about one gallon of boiling water may be added to a stool, which is then covered and allowed to stand until cool. Better still, however, is the following method devised by Prausnitz. A small amount of hot water is added to the stool, then fresh quicklime. The process of slaking raises the temperature and maintains it above the thermal death point of most organisms.

Bath water is easily disinfected by the addition of crude carbolic acid.

Soiled bedding and clothing are best disinfected by removal to a steam disinfecting chamber. Where this is unavailable, immersion in boiling water for five minutes, or in 5 per cent. carbolic acid solution for several hours is efficient.

Mattresses may be disinfected only by steam under pressure. Otherwise they should be burned.

Such articles as leather, morocco, or india rubber, furs, books and similar objects may be disinfected by long continued dry heat, 120 C. for an hour. Unless they are of considerable value, however, they are better burned.

LIQUID DISINFECTANTS

Mercuric Chlorid.—The solutions of mercuric chlorid are extremely poisonous. Recent epidemics of poisoning have made their use in the home undesirable unless carefully guarded. Tablets are now prepared colored, threaded, in odd shapes and put up in various ingenious warning packages. In strength of 1:1,000 it destroys practically all organisms; 1:500 kills spore-bearing bacteria. Solutions are corrosive to metal containers. The following mixture which contains mercuric chlorid in a strength of 1:1,000 is recommended by Parkes:

| | |
|------------------------|-----------|
| Mercuric chlorid..... | ½ ounce |
| Hydrochloric acid..... | 1 ounce |
| Anilin blue dye..... | 1 grain |
| Water | 3 gallons |

Phenols.—This group, of which carbolic acid is the one most widely known, forms the basis of most commercial disinfectants. A 5 per cent. solution of carbolic acid is usually employed.

Copper Sulphate.—In 5 per cent. solution this salt acts as a strong disinfecting agent and through its power to absorb ammonia and hydrogen sulphid, it is a good deodorant.

Zinc Chlorid.—A 10 per cent. solution of zinc chlorid to which a little hydrochloric acid has been added is used for spore-forming bacteria. A 5 per cent. solution suffices for other organisms. Its action in general resembles that of copper sulphate.

Potassium Permanganate.—The solutions of potassium permanganate stain anything with which they come in contact. At least a 5 per cent. solution is required for killing most organisms. The drug is a rather expensive one.

Chlorid of Lime.—This substance has been mentioned for use in disinfecting stools. It is important that the large masses of the stool be broken up in

order that the lime have a chance to act on the organisms. Not less than a 1.5 per cent. solution of the powder (about $2\frac{1}{4}$ ounces to the gallon) should be employed.

Formaldehyd.—This substance is used chiefly as liquor formaldehydi, about 40 per cent. strength. It is chiefly used for its power to produce a disinfecting gas.

Chinosol, N. N. R., is a normal oxyquinolin sulphate. It is a powerful antiseptic, non-toxic, and somewhat stronger as an antiseptic than mercuric chlorid or phenol. It is antiseptic in solutions of 1:10,000. It is a feeble germicide, weaker than either phenol or mercuric chlorid. It is also an efficient deodorant.

Cresol and compound cresol solution are official in the U. S. Pharmacopeia. These preparations are cheaper than phenol. Their disadvantages are the disagreeable odor and their variable composition and activity. While less toxic, they are far from being non-poisonous.

Trikresol, N. N. R., is a liquid consisting of three cresols.

Phenoco, N. N. R., is a mixture of coal tar creosote and higher phenol-homologues in soap solution. It is stated to be non-caustic, non-irritant and for mammals, one-half as toxic as phenol.

Kresamine, N. N. R., and *Disinfectant Krelas, N. N. R.*, are cresol preparations. The former consists of a watery solution of 25 per cent. tricresol and 25 per cent. ethylenediamine. It is claimed to be less irritating than other antiseptics and more penetrating to animal tissues.

Terminal Disinfection.—With reference to the more common infectious diseases, such as diphtheria, scarlet fever and measles, some authorities believe that terminal disinfection is unnecessary. Their claim is based on the belief that conditions are unfavorable for the multiplication of organisms outside the body and that such organisms die shortly after their removal from animal tissue. The handbook of the Bureau of Infectious Diseases of the New York Department of Health says that "in diphtheria and measles, when

patient recovers the sick room is thoroughly cleaned and aired."

Cleansing is a good method of terminal disinfection. The floors and wood work, all mouldings, ledges and window casements should be scrubbed. A vacuum cleaner may be applied to the walls and ceiling, if such an apparatus is available. After cleaning, renovation, including painting, renewal of wall paper and calceining is a valuable measure.

Wherever there is doubt as to the thoroughness with which cleansing and renovation are accomplished, as well as bedside disinfection, and wherever possible without too great inconvenience, terminal fumigation should be done. Hasseltine recommends in combating disease carried by animal hosts, fumigation with sulphur dioxid. The best results, he suggests, are obtained by fumigating all rooms of the structure simultaneously. Five pounds of sulphur per 1,000 cubic feet are sufficient, and should be placed in a thin layer so as to burn rapidly. If fumigating only to destroy vermin, moisture is not necessary. Exposure of four to twelve hours is desirable.

In those diseases that are apparently non-insect borne and communicable, formaldehyd may be used. This should always be properly applied. It should be used at a temperature of 65 F. or higher, and with a relative humidity of 65 per cent. at the beginning of the process. Humidity and the required temperature may be obtained by boiling water in the room. If possible, all the gas liberated should be confined to the room fumigated. The following method devised by Dixon is a good one for the liberation of formaldehyd gas.

Briefly, the procedure is as follows: Ten ounces of liquor formaldehydi and 5 ounces of potassium permanganate are sufficient for 1,000 cubic feet of space. A large receptacle should be used, to avoid spattering, and this should be placed on a noncombustible surface. If there be not sufficient moisture present there will be some danger of the dry gas igniting. Several receptacles in different parts of the room are more effective than one large container. The permanganate is placed in the container and the formaldehyd poured over it. The reaction is shown by ebullition of the

fluid, slight or marked according to its temperature. When once started it continues until all available formaldehyd has been liberated.

In New York City, this method is modified by using 75 gms. of permanganate in 90 c.c. of water, hot if possible; then 30 gms. of paraformaldehyd are added. This is sufficient for 1,000 cubic feet. This method makes less weight to carry, as the water is obtained at the place where disinfection is to be done. The paraformaldehyd is more stable than formaldehyd solution, the latter seldom containing the required 40 per cent.

Dixon has recently reported favorable results by substituting sodium dichromate and sulphuric acid for potassium permanganate. The acid and formaldehyd solution are mixed and allowed to cool. This solution is then poured over the crystals of sodium dichromate, spread in a thin layer in a large container. The mixture is:

| | |
|---|-----|
| Sodium dichromate.....oz.. | 10 |
| Saturated solution formaldehyde gas..pint.. | 1 |
| Sulphuric acid, commercial.....oz.. | 1.5 |

ANAPHYLAXIS—ALLERGY

PROTEIN POISONING

The fact that bacteria could cause protein poisoning was first noted and the condition described, in 1903, by Victor C. Vaughan of Ann Arbor. Protein poisoning is the cause of most urticarial conditions, of many of the skin eruptions, of many of the simple, so-called febricula (a name applied to a fever lasting one or two days with no positive diagnosis determinable), and all of these disturbances are really forms of allergy.

Some protein poisons may cause a lowered or subnormal temperature rather than fever. This is apparently due to a marked dilatation of the peripheral blood-vessels, especially of the splanchnic area, similar to that in shock. With other protein poisonings there may be, for several days, an irregular temperature with morning remissions. If such poisonings persist and the toxins are not rapidly expelled, neutralized or destroyed, there will be an increased elimination of nitrogen and a progressive loss of weight.

A scientific discussion of these protein poisonings has recently been presented by Vaughan (*Jour. A. M. A.*, Nov. 15, 1913, p. 1761).

The symptoms of many diseases are due to the so-called "parenteral" digestion of proteins. Hay-fever and paroxysms of asthma are caused in sensitive individuals by the pollen of different plants, the emanations from different animals, or the dust or odors of many kinds of substances. Any susceptible individual may be sensitized, so to speak, by one or more of these irritant causes and not by others. The inhalation of some substances in almost intangible amounts may cause serious inflammation of the upper air-passages and even of the bronchial tubes.

Many drugs taken internally may sensitize individuals who have peculiar idiosyncrasies against them, and may cause, primarily, gastric and duodenal irritation, and secondarily, disturbances similar to protein poisoning (such as urticaria and swelling of the mucous membranes), which may become serious, as occasionally seen with quinin, salicylates, antipyrin and other coal-tar products. Many of the so-called genito-urinary stimulants of the copaiba class may cause considerable irritation and eruption of the skin.

Living bacterial cells, like other living cells, must form ferments to prepare their food for absorption. Consequently, as described by Vaughan, for a given bacteria to be poisonous to the human animal, for instance, it must have the ability to split up and feed on the proteins of the human being; otherwise bacteria cannot grow and cannot harm the host. Another prerequisite to such poisonings is that the ferments in man must not be immediately destructive to the invading bacterium, although ultimately antibodies may be formed in sufficient amounts to destroy it. A bacterium, then, able to digest the proteins in man renders this host susceptible to its poisoning, unless he has been previously protected either by a previous infection from the specific bacterium or by a previous inoculation or vaccination with the germ or its products which so promotes the formation of antibodies or anti-ferments that it renders the individual immune. This

is the scientific basis of vaccination and protective inoculation.

The value of vaccine treatment is due to the fact that the general system is not producing ferments sufficient to eradicate the special bacterium and its poison, and the inoculation so stimulates the general production of antibodies or ferments, that the local disease is stopped and later eradicated. On the other hand, if a person is suffering from a general poisoning or infection, such vaccines are of doubtful value or may be actually harmful by overstimulating the already worn-out antagonistic cells, and the individual is thus really injured by such vaccination. Therefore the frequent and careless use of vaccines is deplorable and often inexcusable.

ANAPHYLAXIS—ALLERGY

If proteins are naturally digested in the stomach and intestines and are absorbed only as the molecular forms that normally reach the blood, no sensitizing or anaphylaxis or intoxication will occur. If, however, the proteins are absorbed before they reach their final disintegration stages and are then digested parenterally, that is, outside of the intestine, or if they reach the blood through other channels or are injected directly into the tissues, such poisoning or "reaction" occurs, attended by more or less fever, nervous irritability, increase in the number of the white corpuscles, changes in the blood-plasma, kidney irritation, and frequently diarrhea. The system, however, soon produces active or immune bodies to combat the specific ferment.

DEFINITION

By the word "anaphylaxis" is understood generally the more severe phenomena that appear when an animal previously influenced ("sensitized") by a foreign protein, introduced into the blood and tissues by injection or otherwise, after a suitable interval again receives the same protein into its blood and tissues as the result of injection or otherwise. Anaphylactic shock in the guinea-pig is the classical example. As these phenomena are regarded currently as the result of an intoxication with the products of protein splitting, anaphylaxis may be looked on as a protein intoxi-

cation occurring when a prepared animal receives the proper protein into its system.

At first the word anaphylaxis was used to describe the condition in which severe, violent phenomena occur on reintroduction of toxic proteins (eel serum, actinea poison) in animals previously injected with these substances for purposes of immunization. This was contrary to expectation; the previous injections, it had been assumed, would produce a condition of protection, a prophylaxis; as the directly opposite action resulted, the word anaphylaxis, meaning the reverse of prophylaxis, was coined to designate the condition. Before long, hypersusceptibility was introduced as synonymous with anaphylaxis. As a clearer insight into the nature of the condition was gained, especially through the work of von Pirquet on serum disease in man, it developed that in reality the reverse of prophylaxis or hypersusceptibility to poisonous substances is not concerned, but a change in the powers of the body to react on the introduction of foreign proteins. In order to indicate the nature of this conception, von Pirquet coined the word "allergy," which means altered reactivity. At present there seems to be general agreement that phenomena as different as the experimental anaphylactic shock in guinea-pigs, the various manifestations, mild and severe, of serum disease in man, various "food idiosyncrasies," such as egg asthma, poisoning by cow's milk, etc., and the tuberculin and similar reactions are all due to an altered reactivity of the body, altered by previous influence of the foreign proteins concerned on the antibody-producing tissues so that when the conditions are right the foreign proteins are broken up in such a way as to produce poisonous effects that manifest themselves in different ways, depending on quantitative and other relations. Hence the word "allergy" would appear to be an excellent word for the condition because there is in reality no increased susceptibility to any particular poisons, nor is it true that the reverse of prophylaxis exists, because the allergic (anaphylactic) phenomena are the result of reactions between antibody and antigen, incidents in the course of immunization. Accordingly, anaphylaxis, hypersusceptibility and allergy are being

used more and more as synonymous terms, anaphylaxis being applied perhaps more to the severer general symptoms, of which anaphylactic shock is the classical example, and allergy to the milder phenomena illustrated by ordinary serum disease, tuberculin reactions, gonococcal reactions, etc. From what has been said, it may be noted that anaphylaxis, although applied to the same sort of phenomena as when introduced by Richet, no longer has the interpretative significance of its derivation and first usage.

MANIFESTATIONS

The length of time before the occurrence of hypersensitiveness or sensitization varies; the poisoning may be acute, as in so-called "ptomaine poisoning" or in that which occurs from some such toxin as is found in toadstools; or it may require a number of days for the person affected to be sensitized. Sensitization from a serum injection or from the absorption of some protein irritant may not happen until after a series of days, perhaps a week, and this sensitization will often not be recognized until a second injection (the intoxicating dose) of the same serum is administered, or until more of the same protein poison is absorbed, when reaction becomes evident and is sometimes serious in its outcome. Therefore, it cannot be too carefully noted that injection of prophylactic or antitoxic serums should ordinarily not be repeated too long after the first injection has been given. This is not always true of all antitoxins or all bacterins, but it is more or less constantly in evidence. Sometimes the system becomes tolerant to this irritant, and a larger dose, given to obtain a desired reaction, will be borne. In other instances the patient becomes hypersensitive, and the repetition of a previously harmless dose may cause an intense reaction. This has occurred with diphtheria antitoxin a number of times, and would occur with any horse-serum in patients who are susceptible to, and are always hypersensitized by, emanations or dust from horses.

Persons peculiarly susceptible to horse-serum may develop bronchial edema and severe symptoms within a few minutes or hours after an injection of diph-

theria antitoxin; or, in certain instances, they may not develop the asthma, urticaria, joint-pains and fever until after a series of days. Such late symptoms are not generally dangerous, although albumin may appear in the urine, but generally the kidneys rapidly recover and all the symptoms disappear. Other persons may have an intense local reaction to an injection of antitoxin or vaccine out of all proportion to the injury caused and later may show some of the general symptoms. Such cases are very troublesome and more or less serious, but rarely cause death.

When antitoxin is indicated in diphtheria, or horse-serum in hemorrhage, one should be sure to inquire whether or not the patient is an asthmatic or a sufferer from hay-fever, and especially if horse emanations cause either of these conditions. A preliminary injection of a small dose, perhaps just a few minims beneath the skin, will indicate whether there is a marked susceptibility. This phase of the subject has been fully discussed under the subject of antitoxin in diphtheria.

This reaction of the blood, that is, anaphylaxis, to different poisons, seems to be the cause not only of the symptoms which follow vaccination against small-pox, typhoid fever and other diseases or infections, but also of the symptoms of hay-fever induced by different pollens, varieties of dust or odors. It is the cause of asthma in many persons; of the urticaria produced in susceptible individuals by shell-fish, buckwheat or strawberries, and of the symptoms of sensitization or anaphylaxis which sometimes occur even from such ordinary foods as veal, pork, eggs, some kinds of cheese and milk.

It seems also, with our greater knowledge of this blood disturbance, that quite probably the skin eruptions of the exanthems, of typhoid fever, and even of primary syphilis may be due to this hypersensitizing of the blood by the proteins of the specific bacteria. Our recognition of the anaphylactic temperature caused by serums and toxins suggests that the fever process of the various infections may also be due to the protein poisoning caused by the germ of infection.

Discussion of the treatment of these specific infections would lead us astray, but the symptoms attributed

to the poisoning protein in the blood are more or less the same, namely, fever, irritation of the central nervous system, cutaneous irritability and perhaps eruption, more or less muscle pains and concentration of the urine with kidney irritation, lumbar backache, and either constipation or a diarrhea that shows bowel irritation without complete evacuation. In some instances vomiting is present, especially in children, and headache is frequent or constant, dependent on whether the absorption of the poison is intermittent or continuous.

Whatever the infection or irritant that causes these symptoms may be, the general treatment is the same, namely, whatever of the poison is still in the intestine should, if possible, be removed by a free, non-irritating catharsis by castor oil, calomel, or a saline, as advisable. It is quite possible that more of certain kinds of intestinal poisons may be absorbed under the influence of an oil than would be if a saline is administered. If it is a poison to which the patient is susceptible, he certainly should receive no more of the irritating food. If the disturbance is due to the proteins of some specific germ, he should receive only such nutriment as is easily digested, and therefore less likely to furnish incompletely disintegrated protein products for absorption, thus to add more irritants to the already disturbed blood. Consequently, individual idiosyncrasies should be learned and the signs of indigestion noted; the foods that probably will digest most readily and are not too rich in proteins are the only ones that the patient should be allowed.

The next object is to dilute the poison already in the blood by the administration of large amounts of water, perhaps medicated, acidulated, alkalized, carbonated or plain, as seems indicated. The greater the amount of urine passed, and the freer the perspiration, the sooner, in all probability, will the toxins be eliminated, unless they are produced in overwhelming quantities.

If there is an antitoxin for the condition, it should, of course, be administered. The skin should be frequently soothed with warm water (often best made alkaline with sodium bicarbonate) sponging and then perhaps powdered with a simple bland powder, such

as starch. An irritated, erupted skin should not be freely sponged with pure alcohol, which dries the skin and will cause more irritation. The more moisture there is in a skin with an urticarial or exanthematous eruption, the less is the irritation and itching. The temperature is also more rapidly reduced by evaporation. If the fever is excessively high and must be reduced, of course the usual hydrotherapeutic measures should be inaugurated.

CALCIUM

The nutritional value of calcium and its necessary participation in many functions of the body is described under that head. The relationship of diminished calcium content of the blood to some angioneurotic edemas and to some of the urticaria-like localized swellings and edemas, has been lately shown by investigators. It seems to be a clinical fact in many cases that these exudates and symptoms of anaphylaxis are prevented, or are quickly improved, by the administration of calcium. Experimental evidence as to the value of calcium in preventing anaphylaxis is rather contradictory.

DRUGS WHICH CAUSE ERUPTIONS

Urticarias, erythemas and scarlatiniform eruptions may be caused by belladonna, salicylic acid and arsenic or any other salts or preparations, antitoxin, many of the volatile oils and drugs containing them (as copaiba, santal oil, turpentine), some of the synthetic compounds (as antipyrin, sulphonal, etc.), chloral, quinin and its salts, and opium and any of its alkaloids or preparations. These eruptions appear in some patients after a single therapeutic dose of any of these drugs; in others only when the drug is pushed, or when it has been given for some time. The frequency of idiosyncrasy against these drugs follows about the order in which they are named. Arsenic will rarely cause an eruption, unless it is pushed to full physiologic action. Some patients acquire a drug tolerance and no subsequent eruptions occur after the first dose or two. This is typically true of some persons who are susceptible quinin.

Unless the drug is being pushed to full physiologic action with a definite object or a tolerance is expected and desired or the discomfort is unimportant, the drug should be stopped, a cathartic given, and soothing, bland mucous membrane sedatives should be administered, such as bismuth subcarbonate, sodium bicarbonate, milk of magnesia or slippery elm or flax-seed infusions. Even milk and starch-water are sometimes very efficient sedatives to the mucous membrane of the stomach and upper intestine if it has been irritated by a drug. Of course, it is possible that the drug has caused anaphylaxis and the irritant is already in the blood. Then the treatment consists of large amounts of water, a bland diet, alkalies such as potassium citrate, large doses of sodium bicarbonate, and perhaps calcium in some form.

Bromids and iodids frequently cause skin eruptions, occasionally after the first dose, but generally after a series of doses. An eruption quite generally occurs if these drugs are at all continuously given. Some patients, like epileptics or syphilitics, who are given large doses of bromids and iodids for a long time, become tolerant and do not have the skin eruptions, unless the dosage is very large. The iodid eruption is likely to be papular, but is rarely pustular. The bromid eruption is papular and frequently pustular, and the bromids may cause serious skin eruptions. It is sometimes thought that when arsenic is given coincidentally with bromids this troublesome eruption is less likely to occur. It also should be remembered that if sodium chlorid is removed from or greatly reduced in the diet of the patient, such large amounts of bromids as were once given are unnecessary. Therefore, the eruption is less likely to occur. The iodids cause eruptions less often than the bromids. The eruption from either drug rarely causes itching, but it takes some time for the eruption to disappear, even when the drugs have been discontinued.

The treatment of these eruptions is to stop the drugs, if possible, to cause thorough bowel elimination, to give hot baths or body bakes or electric light baths, and massage, as all tend to promote a more healthy condition of the skin. In fact, the bromid

eruptions are less likely to occur if the skin is frequently cleansed and massaged during administration of large doses of the drug.

FEBRICULA

Some short-lived feverish conditions are still termed in medical books "febricula"; still, such a term only means an undiagnosed condition. A slight fever lasting but a day has been termed ephemeral; lasting several days, a febricula. Probably the majority of the feverish attacks which occur more frequently in children are due to some protein poisoning combined with an intestinal upset, and the condition caused is an anaphylaxis. They may be abortive attacks of an exanthem, or, in children, short attacks of glandular fever. They are not infrequently caused by a folliculitis of the nasopharynx, which not being readily seen, is not diagnosed. Inflammation of the adenoid tissue in this region may also cause a febricula. Such patients generally recover rapidly under any treatment, but, if possible, a diagnosis should be made and the proper treatment given.

URTICARIA

It is astonishing that most books on medicine give no description of this condition or of its treatment, though they mention it as a symptom in certain conditions, such as liver disturbance, etc.; but its discussion should be no more limited to books on diseases of the skin than the eruption of measles should be. Urticaria is not a skin disease, although it may be aggravated by certain skin conditions and perhaps also developed by certain disturbances, either vasomotor or of the nervous system.

The name "giant urticaria," sometimes used as a synonym for angioneurotic edema, should be reserved for serious large and changeable localized swellings. An angioneurotic edema may occur frequently or be present every morning in a patient's hands for instance, but ordinarily carries with it no probability of danger. When it is distinctly localized and does not move from place to place, it may be due to a neurosis of the vasomotor system causing a local

dilatation and exudate, with perhaps associated contraction of other vessels. It is a chronic condition and requires long-continued neurotic and nutritional treatment of the patient, although some gastro-intestinal disturbance may be present. Giant urticaria, on the other hand, is a serious, dangerous affection, especially if it attacks the face and mouth, as when present, it is likely to do at any moment, and dangerous swelling in the throat and larynx may occur. This condition should be treated energetically, and the patient should be under close observation.

The treatment of giant urticaria is catharsis with calomel and saline cathartics; a milk diet, if milk agrees with the patient; or a plain water diet; or a cereal diet. Calcium should be given, and alkalies in large doses. Occasionally, large doses of quinin, such as 60 cg. (10 grains) twice a day, or good-sized doses of antipyrin, as 1 gm. (15 grains) three times a day, have seemed almost specific. Atropin pushed to physiologic action is sometimes of value. The exact cause of this serious condition has not been determined. Doubtless, however, it is anaphylactic and due to protein poisoning.

The causes of simple urticaria are food (protein) poisoning, intestinal parasites, poisoning by certain drugs, disturbances of the liver or kidneys, gout, conditions associated with an increased amount of uric acid in the urine, constipation, an abnormally dry skin, and, in fact, anything that impedes normal elimination. Circulatory disturbances, especially when combined with high blood-pressure or arteriosclerosis, may be factors in causing urticarial eruptions.

Urticaria may occur, however, from almost any feverish condition or from any infection, and simply becomes, then, an added symptom. Most frequently urticaria is the most important symptom, and from its intense itching is the cause of the patient seeking medical advice.

The treatment of simple urticaria has been suggested, namely, catharsis, a limited milk or cereal diet, large amounts of water, the administration of alkalies, such as potassium citrate in 2 gm. (30 grain) doses, given four or five times in twenty-four hours,

or some other alkali, if preferred. Potassium citrate may be given as follows:

| | gm. or c.c. | |
|---|-------------|-------|
| R Potassii citratis..... | 40 | or ʒi |
| Aquae gaultheriae..... | 200 | flʒ v |
| M. Sig. Two teaspoonfuls, in water, every four hours. | | |

If it is known that the stomach and intestines have been irritated, bismuth subcarbonate and sodium bicarbonate should be administered, and, if the patient does not quickly recover, some form of calcium.

The patient should be kept cool. Thin and non-irritating underwear should be used. If the patient is a child or one in whom the condition tends to recur, linen or silk underwear should be worn. Warm baths, the water made alkaline with sodium bicarbonate, are soothing to urticarial patients, and will relieve the itching. The skin should not be rubbed, but should be mopped, lest the drying process cause irritation and more itching. The localized spots may be sprayed with alcohol, cologne, or even mild acid applications, such as vinegar. Phenol solutions have long been used to dull the irritability of the peripheral nerves; a 2 per cent. solution, with or without glycerin often suffices, as:

| | gm. or c.c. | |
|----------------------------|-------------|----------|
| R Phenolis liquefacti..... | 4 | or ʒ xlv |
| Glycerini | 25 | flʒ v |
| Aquae menthae piperitae | | |
| •q. s. ad | 200 | flʒ v |

M. Sig.: Use externally as a lotion.

[The preceding should be well shaken and should be labeled as poison.]

Sometimes such applications as "extract of witch-hazel" or a bland oil like almond oil will be soothing to the irritated skin. If the urticarial spots are not in large numbers, such applications as camphor or chloral, with or without menthol, are often valuable, as:

| | gm. or c.c. | |
|-------------------------|-------------|---------|
| R Camphorae | | |
| Chlorali hydrati.....āā | 2 | or ʒ ss |
| Glycerini | 25 | flʒ i |
| Alcoholis.....q. s. ad | 100 | flʒ iv |

M. Sig.: Use externally. [Shake, and label as poison.]

Or:

| | gm. or c.c. | |
|-------------------------|-------------|-----------|
| R Camphorae | | |
| Chlorali hydrati.....āā | 2 | 3 ss |
| Mentholis | 1 | or gr. xx |
| Glycerini | 25 | fl̄ i |
| Alcoholis.....q. s. ad | 100 | fl̄ iv |

M. Sig.: Use externally. [Shake, and label as poison.]

Various dusting powders are often of benefit, especially in children suffering from this condition. The simplest is powdered starch or a talcum powder. Sometimes stearate of zinc, with or without menthol, is of value as tending to adhere to the region that is irritated.

When urticaria continues or recurs, as it does occasionally in its milder forms, the whole physical condition, diet and personal hygiene, of the patient must be very carefully investigated. Some wrong condition will be found and when it is corrected the disturbance will disappear. Especially must the intestinal digestion be studied and the urine tested for indican. If constipation or indigestion is sufficient to cause indican to appear in the urine, measures to prevent the absorption of the irritants will generally cure the urticaria. Occasionally in young or older persons in whom a high tension or arteriosclerosis has begun or who have insufficient kidneys, conditions of the skin exist that cause temporary reddening, and perhaps itching, with the least irritation.

The skin may be so hypersensitive as to allow of what is termed "dermographia." This condition is a pseudo-urticaria, and the treatments that tend to relieve urticaria will generally relieve this condition.

When there are angioneurotic edemas, a diminution of the sodium chlorid in the food will often be a valuable adjunct to the other treatment inaugurated. This is especially true if the kidneys are at all insufficient.

USEFUL DRUGS

CALCIUM

This element, owing to recent investigations in physiology and pathology, has become of exceptional interest therapeutically. Its relationship to the solid tissues of the body has, of course, long been known, but its relationship to the functions of the body, especially to those of the nervous system, has only of late years been investigated or understood. The young child cannot properly grow and the bones do not normally develop if long deprived of calcium. An adult has various functional, and at times pathologic, disturbances from such deprivation. Again, a person may not be deprived of calcium, but may have such chemical disturbances that he loses calcium more rapidly than he can metabolize it, thus suffering actual deprivation. Certain conditions are immediately improved and may be soon cured by the proper administration of calcium.

We are more and more coming to understand that condition of the body which may be termed a hyperacidity, or at least a lessened alkalinity, especially of the blood. So-called acidemia (perhaps a misnomer, as the blood never reaches the point of acidity before a patient dies) is now known to be the terminal condition of many diseases, and is not limited to diabetic coma. The final serious outcome in persistent vomiting, starvation from any cause, gastric intolerance following surgical operations, the vomiting, diarrhea and marasmus of infants, and perhaps the final disturbances of nephritis, is more or less due to general hyperacidity. Imperfect excretion of acid or acid salts by the kidneys or bowels will probably sooner or later cause serious functional and perhaps organic disturbances, and certainly some degree of denutrition. With such diminished excretion of acids the alkalies of the body are more or less neutralized and lost to the tissues, even if not excessively eliminated. The immediate result of such a diminution of alkaline salts is serious

disturbance of the nervous system. Many gastro-intestinal troubles in babies and children are due to an excess of acid and a diminution of alkalies.

The symptoms of such systemic hyperacidity (whatever the disease) are those of fever, that is, increased temperature and pulse-rate, restlessness, insomnia, gastro-intestinal disturbance, and often nausea and vomiting. Gastric tetany seems to be due to the diminished alkalinity of the nerve-cells or nerve-tissue, and it has been pretty conclusively shown that ordinary tetany is due many times to parathyroid disturbance, which is really the result of a calcium insufficiency. The lack of calcium also seems to be in evidence in many instances of infantile convulsions, especially in spasmophilia and acute nervous irritability. It may be a cause of meningismus in typhoid fever or other serious infections, and, perhaps, is one of the causes of epilepsy, or of an epileptic convulsion. Even in puerperal eclampsia when the kidneys are not found seriously insufficient, a considerable diminution of the alkalies, especially of the calcium salts, may be a factor in causing the convulsions.

It need only be suggested that the withholding of starches and carbohydrates and the feeding of meats and such proteins as tend to hyperacidity will always increase the tendency to eclampsia, epilepsy, spasmophilia and convulsions, to say nothing of such acid-producing food as a cause of increased bowel toxemia and more irritation of insufficient kidneys.

Many of the glands which have an internal secretion — the thyroid, parathyroids, ovaries and testicles, pituitary and the thymus in infancy and childhood — seem to take part in normal lime metabolism. The thymus contains a large amount of nucleoprotein and phosphate radicals, and, it would seem, must have a great deal to do with the formation of calcium and phosphate salts for the normal growth of bone. When the child has reached the age of puberty, at which time the largest part of its bone growth has been completed, this gland atrophies, and probably the thyroid assumes, besides its own work, such necessary metabolic work as the thymus has been doing.

The relationship of the pituitary to calcium metabolism has not been determined, but its relationship to enormous bone growth, as in gigantism and acromegaly, has been proved, and this extra growth cannot occur without a disposition of an abnormal amount of calcium bone salts.

In excessive activity of the thyroid gland and the disturbances so well recognized as Graves' disease, with its hypernervous excitability, there is always improvement if meats and other acid-forming foods are removed from the dietary, and a quieting effect on the central nervous system and apparently a diminution in the activity of the thyroid gland is produced if calcium salts are given. Whether these salts simply soothe the central nervous system, or whether an excess of them quiets the activity of the thyroid gland, has not been determined. The action noted, however, is a clinical fact.

Ovarian disturbances have seemed to cause derangement of calcium metabolism. In many instances osteomalacia has been traced to some ovarian disturbance, perhaps a hypersecretion, as such conditions have followed too frequent pregnancies. In some cases the disease has been cured by removal of one or both ovaries.

The relationship of the testicles to calcium is not known, but analogy indicates that they probably take some part in the metabolism of this necessary element. In some animals, from which the testicles have been removed, there has been a retention of phosphates and of lime, and the likelihood of convulsions is less in castrated animals than in those uncastrated, which is one more proof that an excess of calcium in the system seems to inhibit the convulsive irritability of the central nervous system.

The deleterious effect of an excessive amount of magnesium and a deficient amount of calcium in plant life has long been known. In the presence of an excess of magnesium the growth of a plant is slow and imperfect and the plant may die, while with a diminution of the magnesium and the addition of a suitable amount of calcium, the plant will grow normally and vigorously.

It has long been inferred, and has not been experimentally denied, that an acid excess in the system tends to neuralgias, neuritis and neurasthenic conditions.

In diabetes mellitus the alkalinity of the blood is known to be greatly diminished. One of the consequences, if the diminution is not sufficient to cause coma, is the production of boils and carbuncles.

PHARMACOLOGY

Lime salts not only form a large portion of the inorganic part of bones and teeth, but they also occur in small amounts (estimated by Schwarz and Bass [*Am. Jour. Dis. of Child.*, 1912, iii, p. 15] as 0.01 per cent. of the total amount of the body). According to this estimate, a child weighing 10,000 gm. (about 22 pounds) would have only 0.50 gm. (about $7\frac{1}{2}$ grains) of calcium in its soft parts. It has been found that there is more calcium in the brain before than after birth, and that the amount diminishes as the child grows older. The calcium in the blood has been found highest in the child, and this also decreases slowly with age, being higher in breast-fed than in artificially fed children. Children seem to retain calcium longer than adults, and evidently store it. This also is more in evidence in breast-fed infants than in those who receive cow's milk.

It has been stated that it may not be the absence of calcium, but the relationship between sodium and calcium salts that allows nervous irritability, as it seems to be a fact that a diminution of sodium salts and an increase of calcium diminishes nervous irritability. In several instances the calcium has been found diminished in the brains of children who had died from tetany.

Even the soluble salts, Cushny states, are absorbed with difficulty, and the calcium salts "precipitate colloids such as proteins, in much more dilute solutions than the alkalies, and the precipitate is not redissolved by dilution with water." While the calcium salts retard the absorption of fluid from the intestines, they still do not cause catharsis as do the magnesium salts. In fact, lime salts are many times constipating.

Like iron, a very small amount of calcium is absorbed in the alimentary canal, the larger portion, whether in

the form of soluble or insoluble salts, passing off in the stools. Even a considerable portion of the calcium that is absorbed is excreted by the epithelium of the large intestine and also passes off by the bowels, only a small proportion, in normal conditions, passing off by the urine. L. B. Mendel has shown that the administration of calcium will increase the elimination of magnesium in the urine, and similarly, magnesium, when absorbed, leads to a larger excretion of calcium. The calcium so excreted occurs mostly as a phosphate.

Jacoby and Eisner (*Berl. Klin. Wchnschr.*, July 21, 1913, p. 1339), in an article on the influence of calcium salts on the kidney, show that in experimental glycosuria in animals the feeding of calcium causes a diminution not only of the sugar output, but also of the nitrogen. In fact, according to Jacoby, all excretion from the kidneys, except water, was diminished by calcium feeding, and later the animals died. An increased amount of calcium in the food or administered as a drug will decrease the phosphates in the urine, and also its acidity.

Eisner found in a number of instances that the feeding of calcium to patients who had nephritis caused serious retention of substances which should be excreted by the kidneys, that not only was the albumin reduced in amount, but also the total nitrogen. He therefore believes that calcium, in any amount, should not be given to nephritic patients.

It has been many times stated that in tuberculosis or in the pretuberculous stage an increased amount of calcium is lost both in the urine and feces. In fact, a demineralization has been thought to be a forerunner of the development of tuberculosis.

While lime is present in so many articles of food that lime starvation is not frequent, unless deliberately planned (it should be recognized that a meat and bread diet may cause lime starvation), still some chemical condition may prevent the lime of the food from metabolizing to its proper usefulness in the body. This same chemical or biologic mistake occurs in chlorosis when a young girl receives food rich in iron and yet becomes anemic. Or, as previously suggested, some internal excretion may be so disturbed as to produce a waste of

calcium by causing an increased output of lime from the body. Any such deprivation is of course more serious in infants and young children than in later life.

Though it has been shown that lime is not necessary to the formation of fibrin, the fibrin ferment will not be formed and coagulation of the blood will not occur, except when calcium salts are present. While lime is necessary for the normal coagulability of the blood and to lessen the tendency to hemorrhage, still the administration of lime salts by the mouth will not quickly hasten the normal clotting. Such metabolism is slow and cannot be rapidly pushed by giving large amounts of lime. Von den Velden (*Therap. Monatsch.*, October, 1913, p. 685), however, has recently shown that the administration of calcium lactate (from 4 to 6 gm., or from 1 to 1½ drams a day) for five days or more will stop such bleeding as occurs in scorbutus.

It has been shown that calcium will strengthen a weak heart muscle, and clinically many a weak heart may be made to improve by adding calcium to the medication, when such improvement has not occurred before.

It has long been clinically noted that many children suffering from diarrheas are benefited by small doses of calcium, and it may be true that the acute irritability of the nervous system which we term chorea (whether this disease is or is not caused by an infection similar to acute rheumatism) may be due to an increased loss of calcium by the body. Certainly calcium seems to be of benefit in quieting the nervous system of these patients. An enlarged thyroid gland in young girls and women is often reduced to normal size by the administration of small doses of calcium.

LIME IN TUBERCULOSIS

Besides the physiologic determination that there is a loss of lime in tuberculous and pretuberculous patients, for perhaps more than fifty years it has been thought that the hypophosphites were of value in pulmonary tuberculosis; that they not only increased the appetite and nutrition, but also aided specifically in the healing of the tuberculous lesions. Chemically, however, it has been shown that the hypophosphites leave

the body almost unchanged and non-metabolized. It is supposed that it is the phosphorus element in the hypophosphite combination that is of special value, but if any one of these salts is of value it is the calcium hypophosphite, and the value of even this is doubtful, as the calcium is likely to be precipitated in the intestine as phosphate or carbonate and excreted in the feces (*Jour. A. M. A.*, March 8, 1913, p. 747).

Calcium phosphate is perhaps the most valuable biologic salt in cellular development, but unfortunately it is not a simple matter to supply a deficiency in this salt, as administration of calcium phosphate as such will generally not be effective. The calcium molecule in whatever form presented must be broken up and rebuilt in the blood and tissue.

Forced feeding of tuberculous patients and the enormous amount of eggs and milk once given such patients are not now considered advisable by a large number of physicians who are specializing in the treatment of pulmonary tuberculosis.

CALCIUM IN PREGNANCY

Many investigations have shown that during pregnancy and the puerperium there is a diminished amount of calcium in the blood. A large amount of calcium is needed during pregnancy for the growth of the fetus, and immediately after parturition the diminished amount of calcium in the blood is probably due to its being excreted in the milk. It has been suggested that this withdrawal of calcium may cause a fatty infiltration, and later, fatty degeneration of the liver-cells, and therefore a disturbed function of the liver. If this be true, it would seemingly contra-indicate the administration of chloroform during labor if calcium were thought to be deficient, the tendency of chloroform to cause liver disturbances being now well recognized.

If the calcium is much diminished in the blood, the parturient woman may have considerable uterine hemorrhage. This might not be a disadvantage, if a deficient liver caused toxemias of the blood and a tendency to eclampsia. Free uterine hemorrhage is of advantage as a preventive of eclampsia during and after parturition.

While some more recent investigations by Linzenmeier (*Zentralbl. f. Gynäk.*, June 28, 1913, p. 959) have shown that in the blood of some pregnant women, at least, there is an increased proportion of calcium, and that there may not be a decrease of calcium during eclampsia, the need of the body for an extra amount of calcium during pregnancy is unquestionable. The corollary to the proposition that a lime deficiency is likely to be always more or less in evidence during pregnancy, and that it is macroscopically shown by the decay of the teeth during this condition, is that pregnant women should be given calcium salts medicinally and considerable amounts of foods rich in calcium.

It is also quite possible that, if the mother has a deficient supply of lime, the fetus may start its life handicapped by a lime deficiency, its bones may not grow properly, its teeth may not erupt properly, and even later the teeth may decay quickly. Be this supposition correct or incorrect, the mother should certainly receive foods rich in calcium during pregnancy and during lactation. These foods are cheese, milk, yolk of egg, spinach, beans, peas and many fruits. Bread, the white of egg, rice and potatoes contain little calcium, and meat a very small amount.

LIME IN RICKETS AND OSTEOMALACIA

There is no question of the fact that lime is deficient in these diseases. It is only in rare instances, however, that the patients are taking food that is seriously deficient in calcium; usually there is, instead, a faulty calcium metabolism. Therefore, the administration of calcium as a drug to these patients does not give satisfactory therapeutic results. It seems to be a fact that bottle-fed infants, even when given cow's milk, are more likely to suffer from rickets than is the breast-fed infant. It is quite probable that some internal secretion necessary for perfect nutrition is secreted in the mother's milk, may be absent in cow's milk, and hence bottle-fed children may not receive it. It is also quite probable that some children, even if breast-fed, suffer calcium malnutrition because of defective secreting glands in the mother. Also, one or more of the glands of internal secretion in such defective children may be acting insufficiently.

Many infants who do not develop rickets have disorders of digestion, and these are markedly benefited by the administration of calcium as a medicine. On the other hand, it can do no harm to administer calcium to rachitic patients. Small doses of pituitary extract may be of benefit in this disease. Thymus feeding has apparently failed to be of value.

LIME IN SPASMOPHILIA, TETANY AND INFANTILE CONVULSIONS

Disturbances of the parathyroid glands are more or less closely related to these conditions, and it has been found that the administration of calcium is as beneficial as is that of parathyroid substance. Hence calcium is indicated as a part of the treatment in all of these conditions. Even gastric tetany has been benefited by the administration of the calcium salts.

CALCIUM AND ARTERIOSCLEROSIS

Recently, Scandola (*Gaz. d. Osp.*, Sept. 7, 1913, p. 1111) has stated his belief that in arteriosclerosis there is a retention of calcium in the tissues, on ordinary diets, and he believes that this retained calcium is likely to promote the progress of the disease and be an important factor in the disposition of calcium salts in the arterial system. He finds that nothing promotes the elimination of calcium more than the use of foods that contain little calcium, such as bread, potato, rice and meat. Cheese, milk, eggs and many fruits should be avoided.

PREPARATIONS OF CALCIUM

Calcii Chloridum, U. S. P.—This is a white salt, very deliquescent, soluble in water, an irritant, with a sharp, salty taste. It has many disadvantages and no special advantages over calcium lactate; therefore, the lactate should be the salt most frequently used. The dose of calcium chlorid is given in the Pharmacopeia as 0.50 gm. (7½ grains), but the dose of 0.30 gm. (5 grains) is sufficient. It is generally administered three times a day, after meals, and may be given every three hours for several doses, if deemed advisable. As it is irritant, it should not be given on an empty stomach,

but dissolved in some thick syrup and water, or in glycerin.

| | gm. or c.c. | |
|------------------------|-------------|--------------|
| R Calcii chloridi..... | 6 | gr. lxxx |
| Glycerini | 50 | or fl̄ss iss |
| Aqua menthae piperitae | | |
|q. s. ad 100 | | fl̄ss iii |

M. Sig.: A teaspoonful, in plenty of water, three times a day, after meals.

Syrup of tolu may be substituted for the glycerin. Or syrupus calcis, U. S. P. (a syrupy preparation of calcium oxid may be administered in 2 c.c. (30 minim) doses.

Liquor Calcis, U. S. P.—Lime water is a bland, non-irritant water solution of lime (calcium oxid), used internally as a mild antacid. Probably very little calcium, either in this preparation or in the syrup of lime, is absorbed, and the action of these preparations is largely on the bowels. They tend to cause constipation, and are often of benefit (particularly the lime-water) in diarrheas, especially in infants. Lime-water is often added to milk, not only to increase the calcium content, but to prevent the acid of the stomach from causing rapid coagulation with the formation of large curds, since small curds are more easily digested. As lime-water is a harmless preparation, the amount added to an infant's milk should not be too small, and one, two or three teaspoonfuls may be added to each or to every other feeding, dependent on the age and the condition of the child. Externally, lime-water in equal combination with linseed oil forms linimentum calcis, U. S. P. (carron oil), a soothing alkaline protective, which has been used for many years as a sedative for the skin, especially in burns.

Calcii Lactas, N. N. R.—Calcium lactate is a calcium salt of lactic acid. It is much less irritant than the chlorid, and is valuable when a calcium salt is indicated. It occurs as an odorless, tasteless powder, not very soluble in water, requiring twenty parts of cold water to dissolve it. The dose is about 0.30 gm. (5 grains). It is best administered in powder, taken well diluted, or with milk or after meals.

Calcii Glycerophosphas, N. N. R.—Calcium glycerophosphate is the normal calcium salt of glycerophos-

phoric acid. It is a fine white powder, without odor or taste, practically insoluble in water, and is best administered in powder, tablet or capsule. The average dose is 0.30 gm. (5 grains) three times a day, after meals. This is probably the best salt of calcium to administer for nutritional results.

Calcii Ichthyolis, N. N. R.—Calcium ichthyol is a derivative of ichthyol in which calcium is substituted for ammonium.

Calcium Peroxide, N. N. R., and *Calcium Phenolsulphonate*, N. N. R., are used to obtain the action of the peroxide or phenolsulphonate respectively.

Compound syrups of glycerophosphates, as *calcii hypophosphis*, U. S. P., and *syrupus hypophosphitum compositus*, U. S. P., are superfluous preparations.

The *precipitated calcium carbonate* and *prepared chalk* may be used internally, but are most used externally. They are mild alkalies, and tend to cause constipation. The official chalk mixture (*mistura cretae*, U. S. P.), is a harmless simple preparation. If it is desired to give a child chalk, however, it had better be given in powder form and added to whatever nutrient (as barley water, or milk) the child may be receiving. Chalk mixture must be well shaken, and the dose the child would receive is indefinite.

The precipitated calcium phosphate is a preparation that has been greatly used and recommended in bone disturbances. It is an insoluble, white, tasteless and odorless powder. The Pharmacopeial dose is 1 gm. (15 grains). Unfortunately, the calcium phosphate cannot be transferred as such from the intestine to bone structure; the calcium must be entirely metabolized in whatever form it is offered, and therefore this powder in its large (bulky) doses is not needed. The glycerophosphate is a better preparation.

LECITHIN; EGG-YOLK

Phosphorus is such a necessary element in the perfect development and health of the cells of the body, and is so essential in the proper functioning of many parts of the body, especially nervous tissue, that any preparation said to present phosphorus in composition in assimilable form immediately causes clinical inter-

est. Lecithin is a compound of phosphorus that is found in the organism, hence, when it was artificially prepared for administration in various diseased conditions, it became very popular, and was and is highly lauded as a treatment for all kinds of debility, anemias, nervous disturbances, mental diseases and neurasthenia.

In the first place, phosphorus is a constituent of nucleoproteins, and some kinds of phosphorized fats or lipoids, of which lecithin is an example. Phosphoproteins are contained in milk as caseinogen and in the yolk of egg as vitellin.

The discussion ever persists as to which elemental form is of greater value for the nutrition of the body, an inorganic salt or an organic combination. This is particularly true of iron and of phosphorus. It has been demonstrated almost beyond controversy that an ordinary person can metabolize an inorganic iron as readily and as perfectly as an organic iron, and this seems to be more or less true of phosphorus, administered in the form of phosphates or other salts. Also, it has been shown many times that organic phosphorus, as presented in milk or in eggs, probably changes in the body to phosphates, and from these salts it is elaborated into products as lecithin, so that there seems to be no physiologic or biologic reason for preferring isolated lecithin as a medicament to such a phosphorus-bearing food as the yolk of egg.

Phosphorus seems to stimulate metabolism, and often the person who receives phosphorus in any form seems not only to have an increased glandular and nervous activity, but also an increase in general nutrition. Phosphorus as an element, or such an active preparation as zinc phosphid, should rarely be administered as a medicament, as either irritates the gastro-intestinal canal, overexcites the glandular system, especially the liver, and causes more or less irritation of the kidneys. When the question is one of nutrition and the stimulation of the metabolism of the body as a whole, and not of a treatment to ameliorate a troublesome symptom, or of an antidote to any diseased condition, it seems inexcusable to administer drugs that may do harm.

The lipid lecithins are phosphatids, and are substances of waxy consistence, soluble in alcohol, but insoluble in water. They are generally prepared from the yolk of eggs, probably are never quite pure, and contain about 4 per cent. of phosphorus. When lecithin is broken up it results in glycerophosphoric acid, a fatty acid, and cholin, which is a more or less poisonous nitrogenous base.

Under the influence of lecithin the number of red corpuscles and the hemoglobin content in anemic conditions may be increased. That lecithin is a "brain food," or is a stimulant to cerebral activity has never been proved. All statements to that effect are fallacious, in fact, there is no specific food for any part of the body. Certain nerve disturbances and certain cerebral and mental disturbances may at times increase the phosphorus output in the urine, and cause nucleoprotein, and, perhaps, lecithin disintegration; but the mere administration of lecithin, as such could hardly be expected to improve such a condition.

The logical measure, when a physiologic nutritional phosphorus is desired, is the administration of egg-yolk. The yolk of the hen's egg is stated by Friedenwald and Rurah (*Diet in Health and Disease*, 1913, p. 106) to represent 49.5 per cent. water, 15.7 per cent. protein and 33.3 per cent. fat. The yolk of the egg is therefore rich in fat and protein, and has caloric as well as nitrogenous value. To obtain the activity of the lecithin content in the yolk of the egg it is perhaps best to administer the yolk raw. It certainly seems to be a fact that the administration of one or two raw or even cooked yolks of eggs per day would give a patient all the lecithin that he could metabolize, and present it in a better manner than in an artificial preparation. In any condition of debility, anemia or nervous disturbance the yolk of egg is as valuable as any or all artificial lecithins, or any preparation that combines nucleins and nucleoproteins.

It may be here stated, parenthetically, that the value of raw egg-white, or egg-albumin, as a nutrient has been very much overlauded, and dependence on egg-albumin as a food in serious conditions is a mistake. Egg-white has been found in some cases to pass very rap-

idly through the stomach without digestion, and to be incompletely digested in the intestine. Thus it may cause diarrhea, as well as fail to give nutrition.

ICTHYOL

This is a non-official but much used preparation. It is a chemical combination of ammonium with a sulphonic acid obtained by dry distillation from the bituminous shale found in the Tyrol. This shale contains the remains of fossil fishes. The chemical name is ammonium ichthyosulphonate or ammonium sulphoichthyolate. It contains a great deal of sulphur, and the preparation was brought to the notice of the profession by Unna, and was recommended for external use in skin diseases. It is applied to the skin in inflammatory conditions such as erysipelas, acne vulgaris and rosacea, lupus erythematosus, etc., to lessen hyperemia. It is a thick brown liquid which will mix with oils, fats, and with water.

It is a mild antiseptic and resorbent and when mixed with glycerin or olive oil in from 10 to 50 per cent. it has been applied to boils, indurations, inflamed joints, and to chemically inflamed parts. If frequently painted over a part it may cause blistering, but once or twice painting the skin will cause mild counterirritation. It has been recommended lately as a local application to stop pain in neuralgia. Combined with glycerin (10 per cent.) it makes a valuable vaginal tampon to reduce indurations and inflammations of the pelvis. It has been recommended for all kinds of skin diseases, both as an antiseptic and as a stimulant in chronic inflammations. In acute inflammatory conditions of the skin, as erysipelas and burns, weak solutions have been used with apparent advantage.

Ichthyol has had considerable use internally in pulmonary tuberculosis. Its principal value in these instances is, probably, as an intestinal antiseptic. The appetite often increases and there is less intestinal fermentation, it acting in this manner much like creosote. The best method of administering it for this purpose is with an equal part of water, and, beginning with one drop of this solution three times a day, gradually increase it to ten or more drops. Pills or tablets

of ichthyol may also be obtained. The same precaution in using excessive doses should be taken as in using large doses of creosote, viz., that it soon may over-stimulate the gastro-intestinal canal and a loss of appetite occur. It is also used internally for acne when this is due largely to intestinal fermentation. It may be ordered in pill form for this condition as follows:

gm. or c.c.

R Ammonii ichthyosulphonatis.. |
 Pulveris glycyrrhizae.....ãã 3 | or gr. xlv
 M. et fac capsulas 20.
 Sig.: One capsule three times a day, after meals.

A number of preparations occur in New and Non-official Remedies.

HYPNOTICS

It is impossible to enumerate the hypnotics in the order of their importance, as the importance of each individual drug varies with the condition to be combated; consequently the following are arranged alphabetically. The official hypnotic drugs are:

| | |
|--------------|----------------------|
| Bromids. | Paraldehyd. |
| Chloral. | Sulphonethylmethanum |
| Chloralamid. | (trional). |
| Hyoscin. | Sulphonmethanum |
| Morphin. | (sulphonal). |

BROMIDS

The bromids are used to produce sleep and to quiet the nervous system in conditions of irritability and excitation. Their action is largely as a sedative to the spinal cord, and also as a sedative to the cerebral cells. They are depressant to the circulation and, therefore, quiet circulatory excitement. Under their action the heart is slowed and the blood-pressure falls; consequently in any condition of serious heart or circulatory weakness bromids are contraindicated. On the other hand, in any condition of inflammatory irritations of the cerebrospinal system they are indicated.

Their prolonged use tends to cerebral degeneration; consequently in old age and in mental debility or melancholia, or with symptoms of paresis bromids should not be used. Their prolonged use also tends to produce muscular weakness as well as weakened circulation.

sluggish digestion, loss of appetite, and, generally, imperfect nutrition. Mental actions become sluggish, the eyes lose their luster, the face becomes pale, and actual anemia may develop. The perspiration is increased and may be irritating and sour. The whole condition is that of great depression. Such a chronic condition caused by the administration of bromids has been termed "bromism," but the term should be confined to the condition of chronic poisoning.

As the bromids are partially excreted through the skin, they often, directly or indirectly, irritate it, and acne or various papular or even wartlike eruptions can occur. The more carefully the body is cleansed with baths during prolonged administration of bromids the less likely is the skin to show eruption.

The over-action of a single dose of a bromid is shown by acute depression (lowered temperature, weak pulse, cold, clammy perspiration), impaired speech, tremor, profound sleep, perhaps stupor and, possibly, paralysis due to spinal depression.

The treatment of such a condition would be the application of dry heat, atropin and strychnin hypodermatically, black coffee by the mouth or rectum, and artificial respiration if it is needed.

Acute poisoning by bromids is rare, as a single dose to produce poisoning is rarely taken. The large doses often administered in epilepsy do not cause poisoning, as the patient has become tolerant to such dosage.

INDICATIONS

Bromids are indicated as follows:

1. To produce sleep.
2. In hysterical conditions without neurasthenia.
3. In acute cerebral excitement.
4. In inflammation of the meninges.
5. In convulsions caused by irritation of the brain or spinal cord (uremia, tetanus, hydrophobia).
6. In epilepsy.
7. As an antidote in strychnin or other convulsive poisoning.
8. To prevent cinchonism.

The only justification for administering bromids for a long period is in epilepsy, and in this disease it is

a symptomatic treatment, though it seems at times to be curative. The size of the dose that should be used, the total amount and the length of time that the drug should be given must be decided by the symptoms of the disease and by the action of the bromids on the individual patient. However, by greatly diminishing the amount of sodium chlorid allowed in the food, it has been proved that therapeutic effects may be achieved from the bromids in epilepsy with much smaller doses than formerly were given.

As above stated, the eruptions on the skin caused by the continued use of bromids can be much abated or even abolished by the plentiful drinking of water and by daily hot baths. The coincident administration of arsenic is also often successful in preventing these eruptions.

There is no question that in hysterical conditions and conditions that simulate exophthalmic goiter (Graves' or thyroid disease) bromids given for some time are of great value. They are also valuable in the nervousness and vasomotor disturbances of the menopause. The value of a bromid is probably not only in its actual sedative action on the nerve centers, but also by its quieting action on the thyroid gland, which in all of these conditions shows more or less hyperactivity. While in hysterical conditions bromids, even when administered for several weeks, may do nothing but good, it constantly must be borne in mind that their tendency is to cause debility and malnutrition that it may be difficult later to combat. The dose of a bromid to meet these indications is not large, from 0.50 gm. ($7\frac{1}{2}$ grains) to 1 gm. (15 grains), two or three times a day.

As a hypnotic, the dose should be at least 2 gm. (30 grains), given from one to two hours before bedtime. More may be given if deemed advisable. A smaller dose is rarely of any utility. As a hypnotic, bromids should not be given for any great length of time. If a hypnotic must be given for any considerable time, some substitute must be used, so that a habit for bromids may not be acquired.

The bromids are valuable in preventing the unpleasant symptoms from large doses of quinin. The coin-

cident administration of three grains of a bromid for every one grain of quinin, *i. e.*, 1 gm. (15 grains) of a bromid to 0.30 gm. (5 grains) of quinin, will prevent cinchonism. Of course it would be inadvisable to give sufficient bromid to counteract the effect of the enormous doses of quinin given in pernicious malaria, but in ordinary intermittent fever during the period of the administration of fair doses of quinin to patients very susceptible to it, bromids are satisfactory.

The drugs whose physiologic actions are more or less similar to bromids are those that are termed depresso-motors. They are chloral, physostigma (calabar bean), gelsemium and conium. Chloral, however, is the drug that acts most similarly to the bromids and may be substituted for them both as a hypnotic and as a cerebrospinal depressant.

PREPARATIONS

The following bromids appear in Useful Drugs:

Potassii bromidum.

Sodii bromidum.

There is no reason for using lithium, calcium or zinc bromid.

Strontium bromid is supposed to have a little less deleterious effect on the digestion than the other bromids have. The difference is so slight, however, that there is no good reason for using it.

Ammonium bromid is more disagreeable than potassium or sodium bromid, and therefore is not often used. The pleasantest to take is the sodium salt.

The sodium and potassium bromids are the ones most frequently used, and of these the potassium salt may be slightly more hypnotic, but if long given is more depressant to the circulation, as potassium is more of a heart muscle depressant than is sodium. Consequently, for prolonged use the sodium bromid is best.

Hydrobromic acid should never be used as a substitute for bromid. While it causes bromid action, it is acid and therefore more irritant to the gastro-intestinal tract. There is no good reason for using hydrobromic acid.

Numerous bromin derivatives are listed also in New and Nonofficial Remedies.

The potassium and sodium bromids are best administered in plain water, though they may be given in effervescing water if preferred. Any syrup makes the salty taste of the sodium bromid or the flat taste of the potassium bromid more disagreeable.

Bromid tablets should never be swallowed whole, as these concentrated salts may seriously irritate the stomach and cause severe pain and even pseudo-angina pectoris, and may even cause an ulcer of the stomach. Hence, whenever bromids are taken they should be ordered thoroughly dissolved and well diluted.

| | gm. or c.c. | |
|----------------------|-------------|---------|
| R Sodii bromidi..... | 20 | or 3 v |
| Aquae | 100 | fl ℥ iv |

M. Sig.: Two teaspoonfuls in water, two hours before bedtime.

CHLORAL

The action desired and expected from chloral is to produce sleep and to quiet excitability and irritability of the nervous system.

Chloral hydrate is more or less irritant to the skin and mucous membranes, depending on its concentration. If it is diluted or in syrupy solutions, which it forms when rubbed up with camphor in equal parts, while the first sensation may be that of burning, especially when the skin is irritable, the secondary action is a sedative, the peripheral nerves being slightly dulled, and the part becomes mildly anesthetized. Chloral solutions or chloral combinations are therefore sometimes used locally with good effect when there is burning or itching of different parts of the body, such as in pruritus ani or pruritus vulvæ. The same burning action occurs when it is applied to mucous membranes, and is followed by a dulling of sensation. If the solution is too concentrated it may cause ulceration; therefore chloral should never be administered in powder or capsule, but should always be given in solution, well diluted.

Its primary systemic action is as a sedative to the brain and spinal cord. It seems to act specifically as a sedative to the brain cells and produces normal sleep. Whether this sleep occurs by actually stupefying the brain cells or by diminishing the circulation in the

brain has not been determined. It is the nearest to a perfect hypnotic that we have, and may be used whenever a soporific drug is needed, provided there is no serious cardiac or circulatory debility. After an ordinary sized dose the patient awakens in normal condition, and without depression, unless the hypnotic has been frequently repeated. Larger doses will quiet the delirium of meningitis and will stop cerebral and spinal convulsions. When the convulsions are due to a spinal poison, as strychnin, or tetanus or hydrophobia, the dose of chloral must be very large, almost poisonous. Consequently, when such an action of chloral is desired, it should be conjointly given with large doses of bromid, and if the convulsions are frequent and severe chloroform must be resorted to rather than the administration of dangerous doses of chloral.

Chloral is a circulatory sedative, causing some vasodilatation, slowing, and in large doses weakening the heart. In diseased conditions of the heart it has been thought to have hastened death by causing cardiac failure. Except in small doses, it should not be given when the pulse tension is low and the heart action very weak. However, its quieting effect on the circulation and its causing, perhaps, much needed sleep has done a great deal more good than it has ever done harm. Small doses, as 0.20 gm. (3 grains) three times a day, have been given to reduce high tension in arteriosclerosis. It will sometimes do this effectually in this small dose, but perhaps generally the nitrites or iodids act better.

It circulates in the blood as chloral, and is excreted largely by the kidneys, ordinarily without causing irritation. It acts rapidly as a hypnotic, and should cause sleep in less than an hour. In concentrated solutions or when it finds the stomach in such a condition that it may be rapidly absorbed, or in a poisonous dose ("knockout drops"), it can produce sleep very rapidly.

In view of the fact that a few individuals show a peculiar idiosyncrasy for chloral—delirium, etc.—it is advisable to be cautious in giving it to a patient for the first time.

The symptoms of its profound action are more or less profound stupor, dilated pupils, cold, clammy per-

spiration, weak heart action, feeble pulse, and gradually failing respiration.

The treatment of chloral poisoning or poisoning by "knockout drops" is to wash out the stomach with warm water or to remove its contents by emetics. The body temperature should be kept up with dry heat applications, and strychnin should be given hypodermatically. If a full dose of strychnin, as 1/20 of a grain, does not improve the circulation, atropin in a dose of 1/100 of a grain should be given hypodermatically. If the circulation still fails, resort should be had to intramuscular injections of a saturated solution of camphor in olive oil, 1 c.c. (15 minims), which may be repeated every fifteen minutes for several times, if needed, or an epinephrin solution (1:1,000) given once, in a dose of 1 c.c. (15 minims). If the respiration fails, artificial respiration should be resorted to.

If at any time after the administration of a therapeutic dose of chloral cardiac depression occurs, strychnin and digitalis should be given.

ADMINISTRATION

Chloral is a very disagreeable drug to take. It can not be given hypodermatically on account of the size of the dose and the irritation that it causes. It is rarely advisable to give it by the rectum unless convulsions prevent its administration by the mouth. It has a nauseating, acrid, burning taste which is not readily disguised. It should always be given well diluted.

Chloralum Hydratum, U. S. P., occurs in crystals which are very soluble in water and alcohol. It is incompatible with alkalis. The ordinary dose is 1 gm. (15 grains), and when given by the rectum 1.50 gm. (22½ grains).

As above stated, it is almost impossible to disguise the taste of chloral, but it is perhaps best administered in sour solutions, or it may be ordered in plain water and given in fresh lemonade.

| | gm. or c.c. | |
|-------------------------|-------------|----------|
| R Chlorali hydrati..... | 10 | or 3 iii |
| Aquae | 50 | fl 3 ii |

M. Sig.: A teaspoonful in half a glass of fresh lemonade, in carbonated water, one-half hour before bedtime.

Or:

| | gm. or c.c. | |
|---------------------------|-------------|--------|
| R Chlorali hydrati..... | 10 | 3 iii |
| Syrupi acidi citrici..... | 25 | or |
| Aquam | 50 | fl 5 i |

M. Sig.: A teaspoonful, in plenty of water, at bedtime.

Or:

| | gm. or c.c. | |
|-------------------------|-------------|----------|
| R Chlorali hydrati..... | 20 | 3 ivss |
| Syrupi aurantii..... | 50 | or |
| Aquam | 100 | fl 5 iss |

M. Sig.: A teaspoonful, with plenty of water, as directed.

Chloral is often combined with one or more bromids. Generally, however, it is best to have these nerve sedatives in separate solutions so that one may be increased or diminished without variation in the dose of the other, if it be so desired. For instance, in delirium tremens it may be best to continue the bromid and to stop the chloral, or to increase the amount of bromid without increasing the amount of chloral. However, if it is desired to combine them they may be given as follows:

| | gm. or c.c. | |
|---------------------------|-------------|----------|
| R Chlorali hydrati..... | 5 | 3 iss |
| Potassii bromidi..... | 10 | or 3 iii |
| Syrupi acidi citrici..... | 50 | |
| Aquam | 100 | fl 5 ii |

M. Sig.: Two teaspoonfuls, in water, and repeated in two hours if deemed advisable.

Shoemaker suggests the following combination:

| | gm. or c.c. | |
|-------------------------|-------------|-----------|
| R Chlorali hydrati..... | 10 | 3 iii |
| Potassii bromidi..... | 15 | or 3 ivss |
| Syrupi lactucarii..... | 50 | |
| Syrupum aurantium..... | 100 | fl 5 ii |

M. Sig.: Two teaspoonfuls in plenty of water, at bedtime.

When there is pain chloral may be combined with morphin to produce sleep, as:

| | gm. or c.c. | |
|----------------------------|-------------|----------|
| R Morphinae sulphatis..... | 08 | gr. iss |
| Chlorali hydrati..... | 5 | or 3 iss |
| Glycerini | 10 | fl 3 iii |
| Aquam | 50 | fl 5 ii |

M. Sig.: A teaspoonful, in water, as directed.

CHLORBUTANOL

Chlorbutanol, N. N. R., is a white crystalline compound obtained by reaction of acetone on chloroform. It is used like chloral, but claims for its superiority are not wholly substantiated. A dose is 5 to 20 grains, dry or in capsules.

PARALDEHYD

Paraldehyd is a colorless liquid, pungent, irritant, and of a disagreeable odor. While theoretically it should be a stimulant and its action resemble that of alcohol, practically it is such a strong narcotic and hypnotic that its soporific and prostatic effects overcome any stimulant action that it possesses. Its action on the skin would be irritant, especially if its rapid evaporation were prevented. In mucous membranes it causes burning, and if not well diluted irritation and even inflammation. It is so active in this respect that it is even difficult to swallow it into the stomach without choking unless its evaporating and burning properties are held in check by iced water. It is so rapidly absorbed from the stomach that its effect is sometimes almost instantaneous. The heart is quickly stimulated, the pulse bounds and throbbing is felt in the head and arteries of the neck similar to that produced by a large dose of a nitrite, and the patient becomes momentarily dizzy and later faint. The dizziness is due to an increased cerebral circulation, while the faintness is probably due to the dilated blood vessels of the body causing slight cerebral anemia. An uncontrollable desire to sleep quickly develops and the patient may be sleeping soundly in five or ten minutes. How much of this sudden sleep is due to an actual narcotic effect on the brain, and how much is due to an anemia of the brain caused by a rapid dilatation of the blood vessels of the body, has not been determined. On account of the stimulant effect on the heart and the lack of any profound nervous poisoning from the drug, even large doses have not produced death, although frequently the first symptoms from paraldehyd are so intensely disagreeable and disturbing to the patient that he or she will refuse to ever take the drug again. Large doses, however, can produce a condition of uncon-

sciousness from which the patient, at least temporarily, cannot be aroused.

It is excreted mostly in the urine, but considerably by the lungs, and imparts a disagreeable odor to the breath for some hours after the patient awakens.

The sleep caused by paraldehyd is not protracted, and with a therapeutic dose is normal, and the patient awakens without any prostrating effects. It is a hypnotic to which the system becomes accustomed, and larger doses are required to produce sleep; also a paraldehyd habit can be formed, the patient not only learning to need a hypnotic, but craving the stimulation which paraldehyd causes. It seems to have a greater action in a smaller dose in young patients than in those that have a high blood pressure; in other words, patients who can stand a large dose of nitrites without discomfort will require a large dose of paraldehyd to produce sleep. It is not analgesic, and except in large doses will not relieve pain, and if the pain is severe its hypnotic action would be counteracted unless the dose were excessive. In weakened conditions of the heart it is a safer hypnotic than chloral, and is used frequently in the delirium of serious illness, as pneumonia and typhoid, but not always successfully. It is so likely to disturb the stomach in serious conditions that generally it should not be used. It is frequently used as a hypnotic in delirium tremens, and probably acts satisfactorily in this disease through its various activities, i. e., the throat and stomach irritation is satisfactory to the alcoholic patient, the stimulation of the heart is not unlike that of alcohol, and if the dose is sufficient it may produce the much desired sleep.

If a poisonous dose has been taken, or if unexpected intense action is developed from a therapeutic dose, the treatment would be that of a narcotic depressant poison and similar to that of chloral. An emetic should be administered if the patient is seen soon after ingestion of the drug. The body should be kept warm with dry heat, and hypodermatic injections of strychnin, camphor and adrenalin solutions should be given. Atropin could be used if necessary.

The official preparation is Paraldehydum, and the dose is 2 c.c. or 30 minims.

Various menstrua have been suggested in which to administer this disagreeable drug, but there is no menstruum better than iced water, as:

| | | |
|---------------------|-------------|-------------|
| | gm. or c.c. | |
| R Paraldehydi | 50 | or fl̄ss ii |

M. Sig.: A half teaspoonful on cracked ice and water at bedtime.

Ordinarily when this drug is administered the patient should be already in bed and the room quiet and prepared for sleep.

It may also be administered as follows:

| | | |
|---------------------|-------------|------------|
| | gm. or c.c. | |
| R Paraldehydi | 50 | fl̄ss ii |
| Glycerini | 25 | or fl̄ss i |
| Aquam | ad 100 | fl̄ss iv |

M. Sig.: A teaspoonful, in plenty of water, at bedtime.

SULPHONAL

Sulphonal is official under the name of sulphonmethanum. It is a synthetic product, and occurs as a crystalline, colorless powder, without odor or taste. It is almost insoluble in cold water, and but slightly soluble in alcohol.

It is a hypnotic, and has no other therapeutic uses. It is not irritant to either skin or mucous membranes, is but slowly absorbed from the stomach, and hence acts but slowly in producing sleep, and the full effect of the drug may not be felt for four or five hours after its ingestion. It also seems to be so slowly excreted that the second dose, taken on the following evening will cause a much better and more prolonged sleep than did the first dose. It acts chiefly on the cerebral cortex, and produces a sleep resembling natural sleep, which lasts from six to eight hours. The patient generally awakens without any ill effects, but occasionally there is some dizziness, and a feeling of weakness, or of general lassitude. It does not act on the peripheral nerves, and is not an analgesic. Under its full action the reflexes may be diminished, probably by central inhibition. It has no marked action on the circulatory system, and is excreted in the urine chiefly as ethyl sulphonic acid. When large doses are taken part of it

is eliminated by the intestines, and part may be excreted as sulphonal in the urine.

While death has been attributed to 2.0 gm. (30 grains) of sulphonal, enormous doses have been recovered from. It is probable that if a patient were otherwise healthy it would take a very large dose of sulphonal to cause death. The symptoms of its overaction are profound and prolonged sleep, with a gradually failing circulation and respiration.

Chronic poisoning is not infrequently noted, either from the careless use of the drug or from an actual sulphonal habit. There is a general loss of strength, gastro-intestinal indigestion, often diarrhea, loss of weight, and mental sluggishness, or even symptoms suggesting general paresis. There may be weakness of the legs, disturbed patellar reflexes, and cerebral delusions and illusions, and gradual loss of mental power. From repeated doses, and especially from prolonged use of sulphonal, the kidneys become degenerated, albuminuria occurs, and the urine is of a pinkish or cherry-red color. Although sulphonal may cause an actual hemoglobinuria, this discoloration is due to a decomposition of the hemoglobin of the red blood corpuscles and a production of hematoporphyrin.

Sulphonal even in a single dose, and frequently when doses are repeated, may cause a slight eruption on the skin, either papular or scarlatiniform in character.

The treatment of acute poisoning by sulphonal is to hasten the elimination in every way possible, viz., by purgatives, and by the administration of large amounts of water by the stomach and by the rectum to hasten the elimination through the kidneys. If collapse is present it should, of course, be treated as usual by dry heat and the proper circulatory stimulants.

Chronic poisoning, or the sulphonal habit, requires a long period before health may be restored, and it is doubtful if the kidneys ever become again perfect. Sleeplessness must be combated by some drug other than a synthetic product. General tonics, forced feeding, massage, hydrotherapy, and fresh air, should all be utilized in restoring the patient to health, and such treatment and diet should be instituted as is conducive to restoring irrigated or damaged kidneys to normal.

Sulphonal may be selected as a safe hypnotic in ordinary insomnia. It will not combat pain, and it is not sufficiently depressant to prevent its use in ordinary weak conditions of the circulation. It has been used considerably in the insomnia of insanity, but the dose required for this purpose is large. It should be remembered that repeated doses on successive days have an increasing hypnotic effect, at least for a time. If taken for a long period, however, it does cause prostration and muscle debility and a lack of appetite. Also, there is the same danger of forming a habit from this drug as from any other hypnotic. It has been used in the deliriums of acute febrile diseases, and often is efficient and valuable. It is frequently used in alcoholic deliriums, but is not so efficient as chloral or paraldehyd. It has been employed in spasmodic conditions as in chorea, epilepsy, and muscle cramps, but other drugs are better for this purpose.

The drug acts so slowly that it is not advisable in ordinary insomnia to repeat the dose on the same night. Consequently the dose selected should be sufficient to produce sleep. This is ordinarily 1.0 gm. (15 grains), best administered in powder, and drunk with hot water or hot milk at least four hours before bedtime. If the sulphonal is to be repeated on successive nights, less than the above dose will generally prove efficient.

If sulphonal is given for sleeplessness and delirium during an acute disease, a smaller dose, as 0.50 gm. (7½ grains) should be given, which can be repeated in five hours if the first dose does not cause sleep. It may be ordered as follows:

| | |
|--|----------------|
| | gm. or c.c. |
| R Sulphonmethani | 5\| or gr. lxxv |
| M. et fac chartulas, 5. | |
| Sig.: One powder, with a glass of hot milk, at 5 p. m. | |

TRIONAL.

Trional is official under the name of sulphonethylmethanum, and is a synthetic product chemically similar to sulphonal, which occurs as colorless crystals, without odor, and of a bitter taste. It is readily soluble in alcohol, and slightly soluble in water.

Trional is not irritant to the skin or mucous membranes, and, being more soluble than sulphonal, is more quickly absorbed from the stomach, and consequently shows its hypnotic action sooner. It causes sleep, generally within an hour, which lasts about six hours. Its physiologic action is similar to that of sulphonal. It is excreted by the kidneys, and can cause the same discoloration of the urine as described under sulphonal. It is as little liable to cause acute cardiac depression or acute poisoning as is sulphonal, but prolonged use can cause the same chronic debility and kidney irritation.

The treatment of acute poisoning, or chronic poisoning, or a trional habit, is the same as described under sulphonal.

Its only use is as a hypnotic, and under the same conditions as those for which sulphonal is prescribed. It has been thought that it would cause less disturbance, as it acts more quickly and in a smaller dose than does sulphonal.

The usual dose of trional is 0.60 gm. (10 grains), best administered in capsules, with a glass of hot water or hot milk, an hour before bedtime, as:

gm. or c.c.

R Sulphonethylmethani 3| or gr. xlv
M. et fac capsulas, 10.

Sig.: Two capsules, with hot water, an hour before bedtime.

SCOPOLAMIN

Scopolamin (hyoscin) is an alkaloid occurring in *hyoscyamus* together with *hyoscyamin* and *hyoscipicrin*, but in its manufacture is mostly obtained from other sources. It is closely allied to *atropin*, both in its chemical constituency and in its physiologic action.

The official preparation is *Scopolaminæ hydrobromidum*, which occurs as transparent, colorless, crystals of a bitter disagreeable taste, soluble in alcohol, and very soluble in water. The beginning hypodermatic dose is .0003 gm. (1/200 grain).

The official *Hyoscinæ hydrobrominidum* is identical chemically and physiologically with the scopolamin hydrobromid.

Scopolamin (hyoscin) acts locally similarly to *atropin*, viz., it dulls and numbs the peripheral terminæ

tions of nerves, whether in the eroded skin or in mucous membranes, causes dryness of the throat, benumbing of the tongue, and a diminished secretion of saliva. It dilates the pupil more quickly than atropin, but the dilation does not last so long.

After absorption its action ordinarily is quite different from that of atropin both on the nervous system and on the circulatory system. Although there may be a slight period of cerebral excitement, the effect is generally hypnotic. This is especially marked when it is administered hypodermatically, a dose of 1/100 of a grain usually putting a patient to sleep in a few minutes. Occasionally scopolamin causes cerebral excitation similar to that caused by atropin, and perhaps even more active. Such patients show an idiosyncrasy against this drug, and it is not of infrequent occurrence, should always be suspected until the patient's behavior under the drug has become known. A dose of 1/100 of a grain may cause wild excitement and delirium which may last for some time unless inhibited by a hypodermatic injection of morphin, or the administration of bromids or chloral. During such excitation the pupils are dilated, the throat dry, the face flushed, and the heart rapid.

Unlike atropin, which is a stimulant to the heart and a contractor of the blood vessels, scopolamin generally has but little such effect, and even an ordinary hypodermatic dose, 1/200 or 1/100 of a grain, may cause some cardiac and circulatory depression. In fact, when there is cardiac weakness scopolamin should not be administered. This unpleasant debilitating action on the heart is sometimes noticed when this drug is administered in delirium tremens; consequently, it should not be administered to any patient unless the circulation is at least fairly good and the patient can be at rest in bed. In other words, it is inadvisable to administer scopolamin to a delirious patient, when that patient must subsequently be moved to a hospital or to his home.

On account of the occasional undesirable stimulation of the brain by scopolamin and the frequent profound depression of the circulation that it can cause, the beginning dose to any patient whose tolerance is

not known should be 1/200 of a grain hypodermatically. To repeat, it should be thoroughly understood that the action on the circulation clinically is never that of atropin. In other words, atropin may be administered in shock; scopolamin may cause shock.

The sleep from this drug lasts six or seven hours, and may be intensified or prolonged by the coincident administration of morphin. A combined injection of 1/200 of a grain of scopolamin (hyoscin) hydrobromid and $\frac{1}{8}$ of a grain of morphin sulphate will generally cause prolonged and satisfactory sleep. Such a combination in emergencies is perhaps better than a larger dose of scopolamin, but, of course, if scopolamin is to be repeated for a time the morphin should not be given in combination, lest a habit be formed. On awakening from a scopolamin sleep there is often slight circulatory weakness. This signifies that the drug generally should not be administered to a patient as a hypnotic if that patient must arise in the morning and attend to active business. As a hypnotic it should be reserved for the sleeplessness occurring in acute conditions. It is often a satisfactory drug to use in delirium tremens and in the meningitis of pneumonia and typhoid fever. It must not be forgotten, however, that a larger dose may be required when there is active delirium, and such a dose may be followed by circulatory depression. The drug is often of great value in the sleeplessness of insanity, whatever the type. If for any reason scopolamin is given continuously for a time the patient acquires a tolerance and needs a larger dose than at first to cause sleep.

Although a combination of morphin and scopolamin is now often used as a prelude to ether and chloroform anesthesia, it seems inadvisable to give these drugs that cause depressant action on the respiratory center so that the anesthetist can not decide whether respiratory or cardiac failure is due to the previously given drugs or to the anesthetic. If he thinks that the anesthetic is causing the depression he may allow the patient to come sufficiently out of the influence of the anesthetic to permit shock to occur from reflex nerve pain. Morphin and scopolamin are now often administered in sufficient doses to produce anesthesia for

operations or for a painless parturition without the subsequent aid of an anesthetic. While such use at times may be advisable and perhaps may be the best method of producing a loss of nerve sensation, it would be unwise to consider it universally correct or advisable.

The best method of administering scopolamin (hyoscin) is hypodermatically, but it is often advisable to give it for solution in the mouth or in a teaspoonful of water, and for this purpose the ordinary hypodermic tablet is the most satisfactory. The dose thus given by the mouth should not be larger than the hypodermatic dose, viz., 1/200 of a grain.

Scopolamin has been used as a nerve and muscle sedative in paralysis agitans. The beginning dose for this purpose is small, 0.00015 to 0.0002 gm. (1/400 to 1/300 grain) two or three times a day. The patient rapidly becomes tolerant to the drug and requires an increase in the dose. It is therefore best, if possible, to use the drug only at such specific times as it may be necessary to quiet the hand tremor that the patient may write his signature. In such small doses, and on account of the tolerance he soon develops, the drug does not exert its hypnotic influence. It may be ordered for this purpose as follows:

| | | |
|-----------------------------|-------------|--------------------|
| | gm. or c.c. | |
| R Scopolaminae hydrobromidi | 0.003 or | gr. $\frac{1}{25}$ |
| Aquae menthae piperitae... | 100 | f℥ iiii |

M. Sig.: A teaspoonful two or three times a day, as directed.

SCOPOLAMIN-MORPHIN ANALGESIA IN OBSTETRICS

The history of this method is of interest in showing its development. Steinbüchel of Graz (1903) began with small doses of morphin and scopolamin in obstetrics and had no unfavorable results; that is, no dangerous results. Those who followed him used repeated doses of morphin as well as scopolamin — sometimes excessively large doses, with the result that there were serious consequences, particularly the death of the infant. In 1907 a special technic was elaborated by Gauss in the clinic of Krönig at Freiburg in Baden. The technic of Gauss is substantially as follows: The

object aimed at is to make the parturient woman forget her pains, although she may be conscious of them at the time; the condition known as "twilight slumber" (*Dämmer Schlaf*) is produced. The patient is given a dose of $1/200$ scopolamin and $1/8$ grain of morphin. In order to test the mental condition of the patient, she is shown some object and after an interval of about half an hour, this object is again called to her attention. If she remembers having seen it before, she is not sufficiently amnesic, and an additional dose of scopolamin is given. It should be remembered that the method of Gauss is not correctly represented by the frequent recommendations to use scopolamin-morphin for the relief of pain in labor. Let it be emphasized that but a single dose of morphin is used. In this way the frightful mortality that occurs in infants from morphin injections is largely eliminated.

Scopolamin also has its own dangers. Small doses sometimes produce very serious results. There may be great disturbances of the nervous system, or of the heart and lungs. It is impossible to predict when these results may follow its administration and they cannot be guarded against. Proprietary preparations containing fixed quantities of the two alkaloids cannot be successfully used to secure the results desired.

The impression gained from a review of the literature is that the present method of obstetric anesthesia by scopolamin and morphin is not safe for the child and in many cases not safe or successful for the mother. It is distinctly a method for use in rare cases and invariably in the hospital.

CIRCULATORY DEPRESSANTS

NITRITES

The value of the nitrites seems to be their ability to reduce blood-pressure. In some instances an instantaneous reduction is desired; in other conditions, as in arteriosclerosis and chronic nephritis, it is sometimes advisable to keep the blood-pressure constantly reduced.

ACTION OF THE DRUG

The action of amyl nitrite as a vasodilator is instantaneous, and with this action the heart is accelerated

and the head feels full and throbs. It sometimes causes severe headache. If the amount inhaled is considerable the patient becomes faint, and always after nitrite of amyl has been used the patient should remain at rest for some time. The intensity of the action is soon over and, therefore, nitrite of amyl is indicated when instantaneous effect is desired, as typically in angina pectoris, or during the aura of an epileptic seizure. In the first instance, it obviates the danger of cardiac spasm, and in the second instance may abort the convulsion. In sudden cardiac failures, as in ether or chloroform narcosis, nitrite of amyl has sometimes been administered, but for such purposes is rarely indicated.

When a more prolonged vasodilator effect is desired, nitroglycerin is indicated, either administered hypodermatically in soluble tablet where the dose should rarely be more than 1/100 of a grain, or a tablet is allowed to dissolve on the tongue, or a drop or two of the spirit of nitroglycerin, or when slower action is desired, swallowed after a meal. Unless the condition is one of emergency and the quick stimulating effect of nitroglycerin is desired which will immediately be followed by dilatation of the peripheral blood-vessels, nitroglycerin should be swallowed after a full meal. In this way the sudden, intense action with throbbing and fulness in the head is obviated. Nitroglycerin may be administered, when considerable dilator action is desired, every three or four hours, but three times a day, or perhaps better, four times a day (*i. e.*, after each meal and at bedtime), is generally the frequency that is sufficient to continuously keep a high blood-pressure slightly reduced. In hypertension in chronic endarteritis or arteriosclerosis it may frequently be noted that a small dose acts more satisfactorily than a larger one, *i. e.*, many times 1/400 of a grain of nitroglycerin will act better than a larger dose. It must be remembered that such patients do not do well with low tension. Nitroglycerin is also very efficient and very successful in overcoming cardiac distress and dyspnea when there is aortic narrowing, when the left ventricle is not weakened.

Nitroglycerin also often relieves insomnia, when given at bedtime, by causing enough relaxation of the vessels to produce normal anemia of the brain — this in old people. Also, many times in continued fevers when alcohol seems indicated, nitroglycerin may be substituted to cause just sufficient dilatation of the surface vessels to aid in diminishing the temperature, which is one of the valuable actions of alcohol in fever.

It should be emphasized that the disagreeable sudden and unpleasant effects of nitroglycerin may be obviated by giving smaller doses and by administering it after a meal and swallowing it with water; in other words, not allowing the medicine to be absorbed from the mouth.

The value of nitroglycerin in asthma to abort or to shorten the acute attack is well understood. The dose selected, perhaps 1/100 of a grain, should be administered every fifteen minutes until the severe headache or frontal throbbing is relieved, at which time the bronchial spasm will generally have relaxed.

While nitroglycerin is not so quick in its action as nitrite of amyl, and is more prolonged, its action is not so lasting as that of sodium nitrite, hence sodium nitrite is often used in its place. This drug should be administered three times a day, after meals, as:

| | | |
|--------------------------|-------------|-----------|
| | gm. or c.c. | |
| R Sodii nitritis..... | 1 | or gr. xv |
| Sodii bicarbonatis..... | 20 | 3 v |
| M. et fac chartulas, 20. | | |

Sig.: One powder, three times a day, after meals.

If the above alkali is not indicated as it often is in patients who need nitrites, any simple powder, as sugar of milk or any other combination, may be made that is deemed advisable.

PREPARATIONS IN USEFUL DRUGS

Amylis Nitris, nitrite of amyl, is a very volatile liquid which is administered by inhalation only, and the dose is a few drops on the handkerchief, or a glass capsule (or "pearl") is broken in a handkerchief and thus inhaled.

Spiritus Glycerylis Nitratis, the spirit of nitro-glycerin, or glonoin, or trinitrin, as it is also termed,

is a 1 per cent. solution of nitroglycerin, and the dose is one or two drops, administered in water.

Sodii Nitris, sodium nitrite, occurs in white opaque masses or as crystals. It is odorless and has a mild saline taste. It quickly changes to the nitrate on exposure to the air and is then unfit for use. It is very soluble in water, and the dose is 0.065 gm. 1 grain).

Nitroglycerin is also offered in tablet triturate form, the dose ranging from 1/400 to 1/50 of a grain.

MAGNESIUM OXID

MAGNESIA, CALCINED MAGNESIA, OR LIGHT MAGNESIA

Magnesium oxid is a light, fine white powder, odorless and practically tasteless. It is insoluble in alcohol and water, but soluble in dilute acids.

It has no local action on the skin other than that of a dusting powder. In the stomach it acts as an antacid, combining and neutralizing any acid that is present, and the resulting combination causes it to act mildly on the bowels as a laxative.

In acidity of the stomach, whether from too much hydrochloric acid or from lactic acid fermentation, it is a valuable antidote, relieving the symptoms of pain, burning, distress and acid eructations almost immediately.

In intestinal indigestion in children, when there is intestinal flatulence and the feces are more or less acid as shown by hyperemia and irritations about the anus, magnesia is good treatment.

Magnesia is a valuable laxative for bottle-fed babies, as it is tasteless and is really administered in milk. A good preparation for this purpose is the milk of magnesia of the National Formulary.

The laxative action of magnesia may be increased by administering it with a little lemon juice or lemonade.

As magnesia forms insoluble compounds with soluble arsenic and mercury salts, it may be used as an antidote in poisoning from these metals, and a specifically recognized in its antidotal action of arsenic poisoning under the name of Ferri Hydroxidum cum Magnesii Oxido, U. S. P., *i. e.*, the "arsenic antidote." If more active alkalies are not at hand, magnesia may well be used in poisoning with acids.

As a cathartic magnesia is not sufficiently active to warrant its use, the dose required being disagreeably large. As a gentle laxative, given two or three times a day, when there is an abnormal acidity of the stomach, it is certainly of advantage.

The dose of magnesia (*magnesii oxidum*) while stated to be 2 gm., is too much powder ordinarily to be taken at one dose, and, as above stated, if a cathartic is needed, other drugs should be used. As a gentle laxative three times a day, from 0.30 to 0.50 gm. (from 5 to 10 grains) is often efficient, and if there is hyperacidity of the stomach, it is better given after meals. A good method of administering magnesia is in milk, or in a little effervescing water, as carbonated water or vichy. Of course, magnesia could be put into wafers or konseals.

ADMINISTRATION

Magnesia may be administered as follows:

For gastritis with constipation:

| | gm. or c.c. | |
|-----------------------------|-------------|--------|
| ℞ Bismuthi subnitratis..... | 20 | or 3 v |
| Magnesii oxidi..... | 10 | 3 iiss |

M. et fac chartulas, 20.

Sig.: One powder, three times a day, before meals.

If there is hyperacidity of the stomach:

| | gm. or c.c. | |
|-----------------------------|-------------|-----------|
| ℞ Bismuthi subgallatis..... | 10 | 3 iiss |
| Magnesii oxidi..... | 6 | or 3 iiss |
| Sodii bicarbonatis..... | 10 | 3 iiss |

M. et fac chartulas, 20.

Sig.: One powder, three times a day, before meals.

Or, if there is much gastric flatulence:

| | gm. or c.c. | |
|-----------------------------|-------------|----------|
| ℞ Bismuthi subnitratis..... | 20 | 3 v |
| Magnesii oxidi..... | 5 | or |
| Carbonis ligni..... | 5 | gr. lxxv |

M. et fac chartulas, 20.

Sig.: One powder, three times a day, after meals.

Or:

| | gm. or c.c. | |
|---------------------------|-------------|-----------|
| ℞ Sodii bicarbonatis..... | 10 | or 3 iiss |
| Magnesii oxidi..... | 6 | 3 iiss |

M. et fac konseal, 20.

Sig.: A wafer, three times a day, after meals.

As a morning laxative:

R Magnesii oxidi..... 15| gm. or c.c. or 5 ss
M. et fac chartulas, 10.

Sig.: One powder, in a glass of lemonade, before breakfast.

CATHARTICS

GENERAL CONSIDERATIONS

Cathartics may be subdivided into laxatives, purges, salines, and irritants or drastics. The object for which a cathartic is used determines from which class the drug should be selected. The main difference between laxatives, purgatives, salines and irritants is that the members of the first three classes can rarely cause, even in large doses, anything more than free, profuse catharsis. The drugs under the irritant class can cause, sometimes even in small doses, irritation and even inflammation of the intestines, and an actual enteritis.

The indications for the use of a cathartic are: 1, to unload the bowels; 2, to relieve constipation; 3, as an eliminant; 4, to lower blood-pressure; 5, to remove edema or exudates.

1. *To Unload the Bowels:* An evacuant should be given to clean out the intestines when there is an irritant in the bowels, as in acute intestinal indigestion; in intestinal colic, and in acute diarrhea. If the patient is seen in the evening, the best purgative is, perhaps, calomel, in a dose of from 0.10 to 0.30 gm. (2 to 5 grains), followed in the morning by a saline; or if a quicker action is desired, especially if the patient is seen in the daytime, a proper dose of Epsom salt, citrate of magnesium, a seidlitz powder, or a glass of some cathartic mineral water is the best treatment. One of the most valuable purgatives is castor oil, especially for children. But perhaps there is no better treatment for a complete cleansing of the bowels than a dose of calomel combined with 1 gm. of bicarbonate of soda, with the withdrawal of all food for a number of hours, and with a powder of bismuth (bismuthi subnitrates) and salol (phenylis salicylas) for a series of doses, as bismuth 1 gm. (15 grains) and salol 0.30 gm. (5 grains), every two hours, for ten doses. After a longer or shorter interval, from ten to twenty hours,

of abstinence from food, a bland, corrected diet should be instituted.

Rarely in children with intestinal indigestion small doses of calomel, as from $1/20$ to $1/10$ of a grain every hour until there is green purging, is good treatment. The calomel is supposed to have an antiseptic action in the bowels. If a minute portion of it is changed into corrosive sublimate as it passes through the stomach, some antiseptic action occurs. Such chemical change is, however, undesirable on account of causing irritation of the stomach, and nausea and vomiting. These small doses of calomel also cause intestinal irritation and often a troublesome diarrhea, and besides, the cleaning out of the bowels by any such treatment is slow. There is also danger of producing salivation and a good deal of weakness. In other words, much as such treatment is lauded by many clinicians, it is often objectionable, and, generally, if calomel is to be administered it should be given, in the proper dose for the age and condition, to act as quickly and completely as possible.

In obstinate constipation saline cathartics or various combinations of the more active cathartic vegetable drugs are needed. Before giving strong drastic drugs, however, especially such as produce irritation or much peristalsis, a decision must be made that there is no obstruction; in other words, that the condition is not an obstipation. If there is obstruction of any kind, active cathartics will make the condition worse. Reliance, in these conditions, should be on large colon injections of warm water or oil, and if unsuccessful, surgical procedure. It is well to begin the treatment of all acute diseases, especially infections, with a cleaning out of the bowels by means of some simple purge.

The best purges are as follows: Calomel, castor oil, a saline cathartic. The saline cathartics are: Magnesium citrate, magnesium sulphate, potassium and sodium tartrate, seidlitz powder, sodium phosphate, sodium sulphate. Of course, a large dose of any laxative will act as a purge.

2. To Relieve Constipation: In chronic constipation laxatives only should be used; never the strong cathartics or purgatives, and the dose should be just sufficient,

with a properly regulated diet, cold morning sponging of the body, abdominal massage, and physical exercises, such as walking or outdoor games or athletic work, and perhaps abdominal muscular exercises, as, altogether, to cause one good movement of the bowels a day.

If there are hemorrhoids, such drugs as cause pelvic congestion should be avoided. The same is true in pregnancy and in pelvic inflammations. Aloes and rhubarb, unless in small doses and combined with some modifying drug, are perhaps well avoided when these conditions are present. It is sometimes best to give a small dose of a laxative three times a day, after meals, instead of once a day, viz., after supper or at bedtime, the object being ordinarily to have a movement of the bowels directly after breakfast, which is the most convenient time and the best time for most people. This method of administering a small dose of a laxative three times a day is most satisfactory with a preparation of *rhamnus purshiana* (*cascara sagrada*).

If a patient has hemorrhoids or rectal pains, it is often a good plan to cause a movement of the bowels just before going to bed, as this precludes the probability of a fecal mass in the rectum causing congestion all night. If there is plethora, liver or kidney insufficiency, or obesity, a saline laxative in the morning before breakfast is the best treatment.

The best drugs to use as laxatives, and perhaps in the order of preference, are as follows: *Cascara sagrada*, aloin, *podophyllum*, rhubarb, natural spring salts, Rochelle salt, Epsom salt, glauher salt, magnesia, sulphur.

3. *As an Eliminant*: In all toxemias, uremia, diabetic coma, blood poisoning of all kinds, quickly acting cathartics, as croton oil, elaterium, compound jalap powder, Epsom salt (and the activity is in the order named) are indicated. If a purgative is to be daily repeated, the milder salines should be used.

4. *To Lower Blood-Pressure*: When there is cerebral congestion or pressure (in apoplexy, or when there is danger of it), the purgatives that cause large, watery stools, thus relieving arterial pressure, are indicated. The blood-pressure in the head is always less than that

of the rest of the system, hence the lower the systemic pressure, the lower that in the head. Saline laxatives are generally the best for this purpose, and should be given concentrated, or, if the action must be as soon as possible, a drop of croton oil in a little granulated sugar on the tongue is the best treatment.

In advanced arteriosclerosis a daily laxative, combined with a proper regulated diet and such other medication as is indicated, is good treatment.

5. *To Remove Edema or Exudates:* A purge that causes watery stools is indicated when we wish to remove edemas and exudates. As many such cathartics, notably elaterium, are very depressing to the heart, they should be used with care. A concentrated solution, in proper dose, of one of the saline cathartics, is generally satisfactory, and to reap the most advantage from the action of such a solution the liquids taken should be restricted. Drastic cathartics or irritants are: Colocynth, croton oil, elaterium, jalap.

CASCARA SAGRADA

Cascara sagrada was so named by the Spanish, and means sacred bark. It is official under the name of *Rhamnus Purshiana*, and is the dried bark of a small tree growing on the Pacific Coast.

PREPARATIONS IN USEFUL DRUGS

Extractum Rhamni Purshianæ. Dose, about .20 gm. (3 grains).

Fluidextractum Rhamni Purshianæ. Dose, 1 c.c. (15 minims).

Fluidextractum Rhamni Purshianæ Aromaticum. Dose, 1 c.c. (15 minims).

All these preparations taste bitter except the last, and the real dose of any one of them is *enough*, the amount depending on its frequency and the results. Many preparations on the market are almost worthless as laxatives, as the bark must be long kept and the preparations carefully made. The liquid preparations are always the most active, and act as slight stimulants to the mucous membrane of the stomach, hence act rather as bitter tonics. The extract is often dried and furnished in tablets which are rendered tasteless by

coating. If these tablets are properly made, and contain a good preparation of cascara, they are efficient. If a cascara preparation or cascara tablet produces rectal irritation, there is probably some other ingredient than cascara in it to render it active. As pure cascara is not astringent and not irritant to the bowels, and can cause no irritation or congestion in the pelvis, it is not contraindicated in hemorrhoids or in pregnancy.

It cures constipation perhaps as much by causing a daily movement of the bowels and thus creating a proper intestinal habit as by any curative properties that it may possess. The repeated taking of cascara does not create a tolerance, and generally the dose may be gradually diminished. Hence, in most instances this drug is the best laxative to use in chronic constipation. Whether it is best to give a small dose three times a day or a larger dose once a day, depends on the result of a careful study of the individual patient. After the amount necessary has been determined, week by week this dose may be diminished until finally, by the aid of proper diet, exercise, etc., the constipation becomes cured.

PODOPHYLLUM OR MAYAPPLE

Podophyllum is the dried rhizome of a perennial herb which grows in the woods of Canada and northern and middle United States, and is sometimes called wild mandrake and umbrella plant. It contains besides starch, a resin (4 to 5 per cent.), a gum, a fixed oil and gallic acid. The active principle is contained in the resin, and is called podophyllotoxin, to which is due the purgative properties of the drug. The resin also contains podophyllinic acid.

The drug is practically without odor, but has a bitter, acrid taste. It is slightly irritant to the skin, and decidedly so to mucous membranes, and, therefore, is slightly stimulant to the stomach mucous membrane, but acts mostly on the intestinal canal, causing increased peristalsis. Its action is very slow, taking from ten to fifteen hours to cause a movement of the bowels. There may be some griping pains, perhaps accompanied by a little nausea and rarely vomiting. The

movements are soft, and if the drug has been taken alone, there may be several. In proper combinations only one good movement a day occurs, making this drug valuable as a laxative. It seems to cause an increased output of bile, and, therefore, stimulates the activity of the liver. It also probably reflexly or otherwise stimulates the other digestive organs. As it can cause considerable griping and irritation of the intestines, even to causing blood-stained stools, the drug should not be used as a cathartic. As it seems to be active in the duodenum and a stimulant to the liver, it has been classed as a cholagogue. Its irritant action should class it with the irritant or drastic cathartics, although its best use is in small doses in combination with other mild cathartics as a laxative. Consequently its best use is in chronic constipation.

The most active preparation is the resin, which should be combined with other slow-acting cathartics, as aloes, rhubarb or colocynth. It should not be given with cathartics that act quickly, as it would then either be useless and pass off without any action at all, or would cause irritation of the bowels and movements after the quicker acting cathartic had finished its work. It should be remembered that this drug is an irritant, and consequently should not be administered when there is inflammation of the intestines, and should probably not be given to children. Its overaction has caused death. Besides its combination with other slow-acting cathartics, a drug to control its tendency to cause griping is indicated. In other words, it is well combined with hyoscyamus or belladonna, and sometimes with an aromatic-like ginger or capsicum.

The full dose of the drug itself is 0.5 gm, or $7\frac{1}{2}$ grains, but as there is occasionally a susceptibility of patients to overaction from this drug, the beginning dose should be smaller than the above. The best preparation is:

Resina Podophylli (podophyllin), the resin of podophyllum. The laxative dose is 0.005 gm, or $1/12$ grain.

ALOES

The official aloes is the inspissated juice obtained from the leaves of various species, and in the crude

state occurs as brownish masses. Aloes and all its preparations have a bitter taste.

An active principle called aloin has been obtained from aloes. While aloin is less certain in its effect than the purified aloes, it is still generally satisfactory as a laxative. The purgative principle of aloes is said to reside in a principle called emodin, which is probably set free in the alkaline secretions of the upper intestine. The presence of alkalies seems to be necessary for the activities of this purgative principle, and experience seems to teach that many times combination with iron renders the aloes more effective. If a liquid preparation of aloes were administered before meals, if the amount were small, it would act as a bitter tonic or stomachic. The amount, however, must be small, or it would cause nausea.

Aloes stimulates the activity of the muscular coat of the intestine, thus increasing peristalsis, and this action seems to be principally on the large intestine. The movements that aloes causes are soft and dark colored, and the discharges are ordinarily not watery. Aloes seems to have a predilection for irritating or congesting the rectum, and seems to cause congestion generally of the pelvic organs. For this reason it is generally inadvisable to use aloes as a laxative when there are hemorrhoids, rectal or colon irritations, or inflammation of the pelvic organs, or in pregnancy. Its stimulant action to the mucous membrane of the intestines probably reflexly increases the secretion of the liver and pancreas and probably the intestinal glands. Owing to its tendency to cause irritation sufficient to produce griping, the pain from which is referred to the umbilical region, it is generally inadvisable to use aloes in any form as a cathartic, unless it is in combination with some more active drug.

ALOES AS A LAXATIVE

The most important use, then, of aloes is as a laxative, which means a daily dose sufficient to produce one daily movement of the bowels. As the action of aloes is slow, it taking from eight to ten hours or longer to cause a movement of the bowels, the best time to administer this drug is after supper. With

some patients a small dose of aloes or aloin three times a day, after meals, is successful, but generally the one sufficient dose after supper is the best method of treating chronic constipation. As aloes or aloin alone, as above stated, is likely to produce griping for some little time before the bowels are moved, it is generally best to combine the aloes with some drug or drugs that correct such unpleasant action. The most effective drug for this purpose is belladonna, the dose of which should not be large, as there is frequently idiosyncrasy against belladonna, and if one pill or tablet of the combined aloes and belladonna does not produce satisfactory movements, the dose could not be doubled without danger of overaction from the belladonna. A small dose of strychnia added to the aloin pill or tablet is often advisable, as it causes a little more activity of the intestines. It is also often well to add a little ipecac, which also stimulates the upper part of the intestine and the secretion or excretion of bile.

PREPARATIONS IN USEFUL DRUGS

Aloe: The preparation used is an extract from the leaves of various species of aloes, and contains aloin, a resin, a trace of gallic acid, and volatile oil to which it owes its odor. The dose is 0.25 gm., or 4 grains.

Extractum Aloes is a powder, the dose of which is 0.10 gm., or 2 grains.

Aloinum (Aloin) is the active cathartic principle of aloes, and the dose is 0.02 gm., or $\frac{1}{3}$ of a grain.

The dose of aloes, or any of its preparations, or its active principle, is always *enough*, and no more than enough to cause one good movement a day.

In the treatment of chronic constipation aloin is frequently given in doses of from 0.005 to 0.02 gm., or $\frac{1}{10}$ to $\frac{1}{3}$ grain., in combination with extract of belladonna and strychnin.

| | gm. or c.c. | |
|---------------------------------|-------------|----------------------|
| R Strychninae sulphatis..... | 0015 | gr. $\frac{1}{40}$ |
| Aloinae | 02 | or gr. $\frac{1}{8}$ |
| Extracti belladonnae..... | 006 | gr. $\frac{1}{10}$ |
| M. et. fac one pill or capsule. | | |

Sig.: Take one after supper or at bedtime; if at bedtime, with plenty of water.

RHEUM—RHUBARB

Rhubarb is officially the dried rhizome of a plant growing in China or Thibet. The rhubarb cultivated in this country does not seem to possess cathartic qualities. The root or powdered substance has a characteristic aromatic odor, and a bitter, astringent taste, and its cathartic principles may be extracted by water and alcohol. Rhubarb contains, according to Culbreth, about 5 per cent. of chrysophanic acid, emodin, which is the active principle of several vegetable cathartics, two other principles called rhein and rhabarberon, a glucosid, a tannic acid called rheotannic acid, resins, several coloring principles, and a varying quantity of rosette-shaped crystals of oxalate of calcium.

If taken into the mouth, although it is somewhat astringent, its bitter taste increases the flow of the saliva, and in small amounts, increases the appetite and improves digestion, acting as a stomachic. In larger doses it causes several loose movements of the bowels, probably due to irritation of the mucous membrane of the intestine, which directly or reflexly through irritation of the nerves increases peristalsis. This increased peristalsis causes the food to pass more rapidly through the intestine, and this carries with it a larger amount of bile than usual, and, therefore, the feces are soft and contain an increased quantity of bile. Rhubarb increases the secretion of the intestinal glands, and probably also the glands of digestion, and this may also be a cause of the increased intestinal activity. It is a slow-acting drug, and may cause movement of the bowels anywhere from six to twelve hours after its ingestion, depending on the size of the dose, the preparation taken, and the amount of food in the stomach and intestines. If rhubarb is given alone (not combined with other drugs) it generally causes more or less griping. On account of the tannic acid which rhubarb contains, the catharsis from one dose is followed by sufficient astringent action in the intestines to cause future constipation. Hence, unless rhubarb is given to clean out the intestines when there is diarrhea, it is generally inadvisable to give it for constipation unless it is combined with some other laxative drug.

ITS EXCRETION

It is excreted with the feces; in the urine, which is slightly increased in amount; in the perspiration, and in the milk. The feces are yellowish-brown or dark brown in color, and the urine of patients taking rhubarb may be of a reddish color. Such urine becomes purplish-red if an alkali is added to it, which proves that the dark color is not due to bile. The milk of nursing mothers may be yellowish in color, have a bitter taste, and a laxative action; therefore, nursing mothers should rarely be given rhubarb. Occasionally after the administration of rhubarb there is an eruption on the skin which, if urticarial in type, is doubtless due to the irritation of the intestinal mucous membrane, but if macular or vesicular, as has at times been noted, is probably due to the irritation it causes during its excretion by the sweat glands.

The ability of rhubarb to cause catharsis and then stop its action and not continue to cause a diarrhea renders it useful to unload the intestine in gastro-intestinal disturbances in children. In conditions of indigestion, with sluggishness of the bowels, loss of appetite, and general debility, rhubarb is, perhaps, the best drug to use, as it is a bitter tonic, a stimulant to the digestion, and a laxative to the bowels, with a general toning up of the intestines. If castor oil is deemed inadvisable, and the prostrating effect of a dose of calomel is not desirable, in the beginning of the treatment of diarrhea, especially in children, rhubarb makes an efficient cathartic. This drug is also often given in small doses three times a day, in various combinations, to improve digestion and to stimulate the intestines; for this purpose it is often combined with bicarbonate of sodium. As a laxative in the treatment of constipation it is much used, but perhaps best, as previously stated, in combination with other laxative drugs. When there is intestinal indigestion, with too frequent movements of the bowels, with a tendency to loose movement directly after a meal, small doses of rhubarb, perhaps, combined with ipecac and sodium bicarbonate, are effective in correcting the condition. If there is a condition of plethora, or if depletion is desired, or free watery movements, rhubarb is not the

cathartic to use. Rhubarb root is furnished in powdered form, and the cathartic dose is 1 gm., or 15 grains.

PREPARATIONS IN USEFUL DRUGS

Extractum Rhei: Dose, 0.25 gm., or 4 grains.

Syrupus Rhei Aromaticus: This contains 15 per cent. of aromatic tincture of rhubarb and 1 per cent. of potassium carbonate. The dose is 10 c.c., or 2 fluidrams.

Tinctura Rhei Aromatica: This contains, besides 20 per cent. of rhubarb, 4 per cent. of cinnamon, 4 per cent. of cloves, 2 per cent. of nutmeg, and 10 per cent. of glycerin. The dose is 2 c.c., or 30 minims.

JALAP

Jalap is the dried, tuberous root of a climbing vine which grows on the eastern slope of the Mexican Andes, and is also cultivated in India. It is named after Jalapa, or Xalapa, a city of Mexico. It has a slight smoky odor, and a sweetish and mildly acrid taste. The root yields about 8 per cent. of a resin which consists of jalapin and a glucoside, convolvulin, or jalapurgin.

The purgative action of jalap seems to be induced by the action of the bile, hence it begins its activity in the duodenum. It causes congestion of the mucous membrane of the intestines, probably increases the secretion of the intestinal glands, peristalsis is increased, and profuse, watery discharges are the result. There is often pain, and sometimes griping and vomiting. It seems to be less of an irritant than gamboge, podophyllum or scammony, but excessive doses will produce continuous purging. It causes a movement of the bowels in from three to four hours. It does not cause congestion of the pelvic organs or of the rectum, and is perhaps the mildest of the resinous cathartics. As it cannot be detected in the urine, it is probably not absorbed, and as it is difficult to detect it in the stools, it is evident that it is partly or completely oxidized.

Jalap is a very useful cathartic, especially when it is desired to cause absorption of effusions. It is especially indicated for this purpose in ascites and in general anasarca, whether from cardiac insufficiency, renal

disease or cirrhosis of the liver. It is also indicated when the brain is to be relieved of a too high blood-pressure, or when there is congestion of the brain, in meningitis. It is valuable in hypertension, and is especially useful when there is venous engorgement from failure of the heart in dilatation in valvular disease, or in a failure of the right side of the heart from emphysema. When any of these indications are to be met by the use of jalap it should be remembered that the intake of liquids should be restricted, that the profuse watery discharges may so deplete the blood as to cause it to resorb the water that it finds in the tissues or exudates in cases of dropsy, and in cases of venous engorgement from cardiac insufficiency, that it may relieve the heart of excess of fluid so that the hypostatic congestion may be relieved.

ITS VALUE IN DROPSY

Jalap is also often the drug selected to increase the excretion of toxins by the intestines in renal insufficiency and when uremia is present or impending. In this instance, if dropsy is not present, considerable water may perhaps be taken to aid the dilution of the toxins in the blood and to promote the excretion by the skin as well as to increase the watery evacuations by the intestines. In other words, jalap, in three or four hours produces watery stools, causing considerable excretion of toxins from the blood, does not cause much irritation of the intestines, and if the dose is not too frequent, causes but little prostration. Its taste is not unpleasant, and, therefore, it rarely disturbs the stomach, and for this reason is often selected as a purgative in connection with anthelmintics when such are needed to remove intestinal worms in children.

The preparation of jalap most frequently used is:

Pulvis Jalapæ Compositus, U. S. P., the compound powder of jalap, which contains 35 per cent. of jalap and 65 per cent. of potassium bitartrate (cream of tartar). The adult dose is 2 gm. (30 grains). This may be repeated in five hours if there are no results. When necessary, this preparation may be given every morning for several days without causing prostration or intestinal irritation.

CROTON OIL

Oleum tiglii, U. S. P. (genitive, *olei tiglii*), is a yellow, somewhat viscid, fixed oil expressed from the seeds of the fruit of a small tree which grows in Southern Asia and the Philippine Islands. The seeds contain from 30 to 40 per cent. of this oil. The oil contains glycerides of various fatty acids, crotonol (the vesicating croton resin), and crotonolic (or crotonoleic) acid (closely allied to oleic and ricinoleic acid). The croton resin is soluble in alcohol.

Croton oil is burning and acrid in taste, and an irritant to the skin and mucous membranes. On the skin it produces redness, papules passing into vesicles, and finally into pustules, which in healing leave white scars. Croton oil has been classed, for this action on the skin, as a "pustulent." Occasionally it may cause a general eruption resembling small-pox. Sometimes enough has been absorbed from the skin to cause purging.

When taken internally, unless very dilute, it is irritant to the stomach and intestines. It congests the mucous membrane of the intestines and increases peristalsis, causing copious stools accompanied by griping pains and a good deal of burning and irritation of the rectum and anus. It acts rapidly, a drop or two on the tongue causing a stool in one or two hours.

Large doses cause violent purging, griping, vomiting and collapse, and a few drops have been known to cause death. If it has been taken by mistake, a quickly acting emetic is indicated, with later mucilaginous, soothing drinks and a hypodermatic dose of morphin. If it has been in the stomach long enough to cause severe purging, the treatment is that of acute enteritis, and the collapse should be treated as usual, with external heat and cardiac stimulants.

Croton oil is used when a quickly acting cathartic is indicated, especially when there is difficulty in causing the patient to swallow, and a rectal injection of a cathartic is inefficient or too slow. Consequently, croton oil is used in uremia and in the coma of apoplexy where it is deemed advisable to reduce the blood-pressure by purgation. It has been used in the constipation of lead poisoning and in other obstinate con-

stipation, but it should be used with great care lest intestinal obstruction be present. It may be used at times in the constipation of maniacal patients who refuse to take other medicine, as the dose of this is so small it can be more readily administered.

The dose of croton oil is one or two drops, and is well administered in a bread pill, made at the time, if the patient is able to swallow. If the patient can not swallow, a drop or two may be put on a little granulated sugar and this put into the patient's mouth, or, if necessary, a single drop may be placed on the back of the tongue. In conditions in which it is indicated a drop may be repeated every hour for several doses until purging takes place. It will rarely take more than two or three doses. Minute doses of croton oil are sometimes added to laxative pills to make them more active. This is inadvisable, however, as the tendency, as previously stated, of irritant cathartics either to cause inflammation of the intestines or at least increase the tendency to constipation should preclude their use.

Croton oil should not be administered to children, to debilitated patients, or to pregnant women except in desperate cases of uremic poisoning. Also gastrointestinal inflammation or peritonitis should prohibit its use.

ELATERIN

Elaterin is a neutral, active principle obtained from the juice of a fruit (a cucumber-like affair) of a trailing vine which grows in the countries around the Mediterranean Sea. One hundred of these cucumbers yield only a gram (15 grains) of elaterin, and it takes about eighty pounds of them to produce thirty grams (an ounce). Elaterium, or the dried juice of the cucumber, occurs in small, grayish fragments or masses, and has a tea-like odor and an acrid taste. Owing to its adulteration and variation in strength the elaterium as such is not now recognized in the Pharmacopeia, but its active principle, elaterin, is extracted, of which the juice contains from 25 to 35 per cent. Elaterin occurs in small white scales or crystals, is of acrid bitter taste, is without odor, is insoluble in water, and but slightly soluble in alcohol.

ITS ACTION

It is irritant to the skin and mucous membranes, and frequently causes ulceration of the fingers and eyes of those working with it. Internally its action resembles that of colocynth, but it is far more powerful. In small doses it acts as a stimulant to the gastro-intestinal mucosa, increasing its secretion. It is also a stimulant to the pancreas and liver, perhaps reflexly. In larger doses it is irritant to the intestine, producing profuse watery stools, usually accompanied with griping and nausea, and occasionally with vomiting. Elaterium is one of the most powerful hydragogue cathartics, and large doses can produce dangerous prostration and even death. Elaterin acts when used hypodermatically, but is much more efficient when given by the mouth, as the bile seems to render it more active.

INDICATIONS

Elaterium is indicated when it is advisable to produce profuse serous discharges from the intestines, and has been used for many years in dropsies. It is especially valuable when there is effusion in the serous membrane cavities (pericardial, pleural and peritoneal cavities), and it is often used successfully when there is general anasarca. Frequently diuretics will not act efficiently until free watery catharsis has relieved the pressure from exudates. Whenever this drug or any other is used to relieve dropsies it must be remembered that the intake of water in any form must be diminished. Elaterium has long been used in uremic conditions, whether there is dropsy or not, and it has often seemed that it relieved cerebral symptoms better than any other hydragogue cathartics. It has been thought that it caused the elimination by the intestines of more of the products of metabolism, that the kidneys could not excrete, than any other cathartic. It has also been used to relieve cerebral and pulmonary congestions, acting as a revulsant. However, in cerebral congestion a quicker acting drug, as croton oil, is often better, and in dangerous acute pulmonary congestion any quickly hydragogue cathartic, as magnesium sulphate, will act as well, or better still, venesection as indicated.

The contraindications to the use of the elaterium are, gastric or intestinal inflammation, extreme exhaustion, any weak heart condition, and pregnancy. Unlike the action of croton oil, and unlike the action of the saline cathartics, after the movements of the bowels begin they tend to keep up, causing a large drain of water from the system, which becomes very depressing, and sometimes can be stopped only by the hypodermatic use of morphin with atropin. This undesired action of elaterium prevents its frequent use.

ADMINISTRATION

The dose of elaterin is from 0.003 to 0.006 gm. (from 1/20 to 1/10 grain), and it may be repeated once or twice at five-hour intervals, depending on the results.

It is not wise to use elaterin every day or even every second or third day, as it causes prostration and may cause intestinal inflammation. Consequently, if watery catharsis is desired daily, some saline cathartic should be selected.

SALICYLIC ACID

Salicylic acid may be classed as an antiseptic, as a bowel antiseptic and as a "specific" in acute inflammatory rheumatism or acute arthritis. As a local antiseptic it is valuable, but too expensive for extensive use. Its greatest value as a local antiseptic is in powders and ointments. Salicylic acid in some form represents, perhaps, the best bowel antiseptic that can be administered. For this purpose some combination of it or some salt of it which does not break up and become absorbed as quickly as does salicylic acid or sodium salicylate is better. The antiseptic action then extends farther down to the small intestine.

INTESTINAL ANTISEPTIC

While, on the one hand, it is absurd even to consider the possibility of rendering the intestinal canal aseptic, it is just as absurd to believe that some form of salicylic acid cannot render the upper part of the intestine less likely to become the abode of bacteria, because such would not be the fact. In other words, it is certainly possible and is clinically easily demonstrated

that fermentation and putrefaction in the intestine may be diminished by the administration of a salt of salicylic acid, as represented by salol or phenylis salicylas. It is well recognized that the normal hydrochloric acid of the stomach tends to inhibit fermentation, not only in the stomach, but in the upper part of the intestine. It is also recognized that, while normally bile is not a germicide, it does inhibit putrefaction in the intestine. Salicylic acid has the same power, and perhaps much more in acting as a bowel antiseptic. It may be able not only to prevent typhoid and other germs, especially the colon bacillus, from migrating to the upper part of the intestine, but after absorption it may be able to prevent these germs from coming to the upper part of the intestine, gallbladder, etc., by the lymph and blood streams. At any rate, it is a common and every-day demonstration that diarrheal disturbances, not chronic, but due to acute infection or to poisonous articles of food, are stopped and prevented by salicylic acid in the form of phenylis salicylas.

Another advantage of phenylis salicylas is that it does not disturb the stomach, not being broken up there into its component parts of phenol and salicylic acid, *i. e.*, not under ordinary conditions, it being only so decomposed in alkaline media.

It is somewhat irritant to the mucous membranes, and for this reason may cause nausea or vomiting and a reflex urticaria.

The signs of its full action are known as "salicylism" and are not unlike "cinchonism," *i. e.*, there is a fulness of the head, perhaps headache, ringing of the ears and sometimes dizziness. With ordinary doses of a pure, natural product, *i. e.*, preparations made from plants and not synthetically, the heart and circulation are not disturbed, although the surface blood-vessels are dilated, and thus there is caused an increased perspiration. If salicylic acid is too long administered, by its power to increase nitrogen waste, impaired nutrition occurs, and debility is caused. The patient also may become anemic, with a tendency to hemorrhages and bleeding from the mucous membranes. Therefore, salicylic acid in any form should

not be administered in any dosage but minute for longer than two weeks at a time as the outside limit.

INTERNAL ADMINISTRATION

The ordinary dose of salicylic acid and of sodium salicylate are the same, as the former is less soluble than the latter, although the latter is naturally the weaker preparation. The adult dose in rheumatic fever is a gram (15 grains) of either of these preparations, administered four times in twenty-four hours, or for a few doses, perhaps, at four-hour intervals. Symptoms of "salicylism" occurring should cause the frequency or the size of the dose to be decreased. If an acute arthritis is not improved in four or five days, and certainly in a week, the salicylic acid should ordinarily be stopped. If there is improvement it may be continued in smaller doses, two or three times in twenty-four hours, for a longer period.

As the drug is very sweet, it is absurd in administering it to add any sweet preparation to disguise it, and generally the simplest method of administering a drug is the best. If the dose to be administered is very small, from 0.01 to 0.25 gm. (from 2 to 4 grains) it may occasionally be given in capsule form, but in that case it must be given after a meal, as when it begins to dissolve it may cause considerable gastric pain and even vomiting. This might be prevented by a combination with bismuth, as:

| | | |
|--------------------------|-------------|----------|
| | gm. or c.c. | |
| R Sodii salicylatis..... | 5 | or |
| Bismuthi subnitrat. | aa | gr. lxxv |
| M. et fac capsulas, 20. | | |

Sig.: One capsule, three times a day, after meals.

If given in liquid form, which is the best way, the following is not especially unpleasant:

| | | |
|--------------------------|-------------|---------|
| | gm. or c.c. | |
| R Sodii salicylatis..... | 20 | or 3 v |
| Aquae gaultheriae..... | 100 | fl 3 iv |

M. Sig.: A teaspoonful, with plenty of water, every six hours.

This could also be administered in some sparkling water.

A sodium salicylate is sometimes deemed advisable, as follows:

| | gm. or c.c. | |
|--------------------------|-------------|--------|
| R̄ Acidi Salicylici..... | 20 | or 3 v |
| Sodii bicarbonatis..... | āā | |
| M. et fac chartulas, 20. | | |

Sig.: A powder, in a glass of water, every four hours. To drink as effervescence is about completed.

The oil of wintergreen may be used in place of the salicylic acid, if desired. The dose is 1 c.c., or 15 minims. It may be obtained in elastic capsules and thus administered, but should not be taken on an empty stomach. This preparation is sometimes rubbed into joints or applied on cotton to the affected parts.

Methylis salicylas, methyl salicylate, an artificial or synthetic oil of wintergreen, is also used externally as a liniment in rheumatic conditions.

SALOL

Salol, or phenylis salicylas, ordinarily should not be used in rheumatic fever. It should also not be used when there is any kidney disturbances, as the phenol part of the preparation can cause kidney irritation. Salol should also rarely be used in very large doses, or too long, or in large doses too frequently, as it can cause the urine to become dark, indicating phenol poisoning, and it may even cause hemoglobinuria and other symptoms of phenol poisoning. The best use of salol is as a bowel antiseptic, for which it may be given in doses of 0.50 gm. ($7\frac{1}{2}$ grains) repeated two or three times, or doses of 0.30 gm. (5 grains) repeated a series of times, or a still smaller dose repeated a number of days.

Salol is also much used in specific urethritis, and is valuable in certain forms of cystitis and pyelitis. As a bowel antiseptic:

| | gm. or c.c. | |
|------------------------------|-------------|---------|
| R̄ Phenylis salicylatis..... | 2 | or 3 ss |
| Bismuthi subnitratis..... | 4 | 3 i |
| M. et fac chartulas, 4. | | |

Sig.: One powder every three hours.

Or:

| | | |
|-----------------------------|-------------|------------|
| | gm. or c.c. | |
| R Phenylis salicylatis..... | 3\| | or gr. xlv |
| Bismuthi subnitratis..... | 10\| | 3 iiss |

M. et fac chartulas, 10.

Sig.: One powder every two hours.

For gonorrhea:

| | | |
|-----------------------------|-------------|-------------|
| | gm. or c.c. | |
| R Phenylis salicylatis..... | 5\| | or gr. lxxv |

M. et fac capsulas, 20.

Sig.: One capsule every four hours.

In typhoid fever:

| | | |
|-----------------------------|-------------|--------|
| | gm. or c.c. | |
| R Phenylis salicylatis..... | 4\| | or 3 i |

M. et fac capsulas, 20.

Sig.: One capsule every six hours.

EXTERNAL USES

The oil of wintergreen is often used externally in rheumatic conditions, but the methyl salicylate is probably as valuable and much cheaper. Either may be used undiluted, applied to the affected joint on absorbent cotton, or a little may be rubbed into the joint, or they may be diluted, as:

| | | |
|-----------------------------|-------------|-------------|
| | gm. or c.c. | |
| R Methylis salicylatis..... | 10\| | or flʒ iiss |
| Petrolati | 25\| | ʒ i |

M. Sig.: Use externally as directed.

Or the methyl salicylate may be used as a liniment, as:

| | | |
|-----------------------------|-------------|--------|
| | gm. or c.c. | |
| R Methylis salicylatis..... | 50\| | or |
| Linimentum saponis.....ad | 100\| | flʒ ii |

M. Sig.: Use externally as directed.

Or:

| | | |
|-----------------------------|-------------|--------|
| | gm. or c.c. | |
| R Methylis salicylatis..... | 50\| | or |
| Linimentum chloroformi..... | 100\| | flʒ ii |

M. Sig.: Use externally as directed.

Shoemaker suggests the following three prescriptions for profuse or fetid perspiration:

| | | |
|---------------------------|-------------|---------|
| | gm. or c.c. | |
| R Acidi salicylici..... | 10\| | 3 iiss |
| Bismuthi subnitratis..... | 15\| | or 3 iv |
| Zinci oleatis..... | 10\| | 3 iiss |

M. Sig.: Use on the parts affected.

For eczema with fissures:

| | gm. or c.c. | |
|--------------------------------|-------------|-----------|
| R Acidi salicylici..... | 3 | gr. xlv |
| Betanaphtholis | 50 | gr. vii |
| Unguenti hydrargyri nitratis.. | 10 | or 3 iiss |
| Unguenti zinci oxidi..... | 20 | 3 v |

M. Sig.: Use externally as directed.

For dry eczematous patches on the skin:

| | gm. or c.c. | |
|---------------------------|-------------|--------|
| R Acidi salicylici..... | 2 | 3 ss |
| Bismuthi subnitratis..... | | or |
| Amyli | 10 | 3 iiss |
| Adipis lanae hydrosi..... | 30 | 3 i |

M. Sig.: Use externally as directed.

The following may be used for pruritus:

| | gm. or c.c. | |
|--------------------------|-------------|---------|
| R Zinci oxidi..... | 5 | 3 iss |
| Phenolis liquefacti..... | 25 | or ℥ iv |
| Acidi salicylici..... | 50 | gr. vii |
| Petrolati albi..... | 30 | 3 i |

M. Sig.: Use externally as directed.

The following may be used for profuse, oily secretion of the skin:

| | gm. or c.c. | |
|---------------------------|-------------|------------|
| R Acidi salicylici..... | 1 | gr. xv |
| Olei olivae..... | 15 | or fl 3 ss |
| Adipis lanae hydrosi..... | 20 | 3 v |
| Aquae rosae..... | 25 | fl 3 vi |

M. Sig.: Use externally as directed.

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